TM 11-850

WAR DEPARTMENT TECHNICAL MANUAL

RADIO RECEIVERS BC-312-(*), BC-312-(*)X, BC-342-(*), BC-314-(*) and BC-344-(*).

WAR DEPARTMENT • 15 MARCH 1944

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WASHINGTON 25, D. C., 15 March 1944

TM 11-850, War Department Technical Manual, Radio Receivers BC-312-(*), BC-312(*)X, BC-342(*), BC-314-(*) and BC-344-(*), is published for the information and guidance of all concerned.

[A. G. 300.7 (24 Aug. 43)]

By order of the Secretary of War:

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DESTRUCTION NOTICE

WHY — To prevent the enemy from using or salvaging this equipment for his benefit.

WHEN — When ordered by your commander.

HOW — 1. Smash — Use sledges, axes, handaxes, pickaxes, hammers, crowbars, heavy tools, etc.

2. Cut — Use axes, handaxes, machetes, etc.

3. Burn — Use gasoline, kerosene, oil, flame throwers, incendiary grenades, etc.

4. Explosives — Use firearms, grenades, TNT, etc.

5. Disposal — Bury in slit trenches, fox-holes, other holes. Throw in streams. Scatter.

USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT.

WHAT — 1. Smash — Tubes
Resistors
Capacitors
Coils
Switches
Tuning dials
Dynamotors
Crystals
Chassis

2. Cut — Chassis wiring
Connecting Cordage

3. Burn — All diagrams
Instruction books
Technical manuals

4. Bury or scatter — Any or all of the above pieces after breaking.

DESTROY EVERYTHING

SAFETY NOTICE

CAUTION: THIS EQUIPMENT EMPLOYS HIGH VOLTAGES WHICH ARE DANGEROUS AND MAY BE FATAL IF CONTACTED BY OPERATING PERSONNEL. WHEN WORKING ON THIS EQUIPMENT, ALWAYS GROUND EVERY PART BEFORE TOUCHING IT.

SECTION I
DESCRIPTION

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General	1
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1. General.—

The radio receivers described in this manual are of the superheterodyne type. They are built ruggedly and are suitable for vehicular, portable, or fixed operation. They are highly sensitive and selective and are designed for the reception of voice, tone, or continuous-wave signals from transmitting stations using amplitude-type modulation. These receivers are identical in size, in general external and internal construction and appearance, and in the fundamental arrangement of their electrical circuits. They are divided into two main groups. The first covers the frequency range of 1500 to 18000 kilocycles in six bands; the second covers the range from 150 to 1500 kilocycles in four bands. For purposes of identification in this manual, the first group is referred to as the high-frequency (h-f) group, and the second group as the medium-frequency group (m-f). Within each group are models for operation on either storage batteries or alternating-current power sources.

2. Differences In Models.—

a. It is advisable for all using personnel to become thoroughly familiar with the differences in the various models. Much confusion in the requisitioning of complete receivers and replacement parts for them arises from the fact that more than a dozen similar type numbers are listed for receivers that look alike. The following description is organized according to the frequency ranges and power requirements mentioned in paragraph 1. (See Sec. III for a detailed description of the actual circuits.)

b. It will be noted that some identical receivers within a series have type numbers with different suffix letters. These numbers identify equipment made to the same specifications but on different orders, either by one or several manufacturers.

c. Table Showing Characteristics Of Different Models.—

Model	Freq. Range KC	No. of Bands	External Voltage Supply	Input Power (Watts)	Oscillator Compart. Heaters	Noise Balancing System	Crystal Filter Circuit	Weight Pounds	Remarks
BC-312	1500-18000	5	12-14v D.C.	90-100	Yes	Yes	Yes	58	Uses DM-17-A Dynamotor.
BC-312-A	"	"	"	50- 60	No	"	"	56	This and subsequent D. C. models employ DM-21-(*)
BC-312-C	"	"	"	"	"	"	"	56	
BC-312-D	"	"	"	"	"	No	"	56	
BC-312-E	"	"	"	"	"	"	"	56	
BC-312-F	"	"	"	"	"	"	"	56	
BC-312-G	"	"	"	"	"	"	"	56	
BC-312-J	"	"	"	"	"	"	"	56	
BC-312-HX	"	"	24-28v D.C.	25- 35	"	"	"	48	All Phone Jacks 2d Audio; VT-134 instead of VT-66.; Antenna Relay Also Disables 1st Audio
BC-312-NX	"	"	"	"	"	"	No	48	" " " Osc Compart. Heat Insulator Removed
BC-312-L	"	"	12-14v D.C.	50- 60	"	"	"	56	" " "
BC-312-M	"	"	"	"	"	"	"	56	" " "
BC-312-N	"	"	"	"	"	"	"	56	" " "
BC-342	"	"	110-120v A.C.	100	Yes	Yes	Yes	61.5	Refer to remarks for BC-312 with same suffix letter for circuit changes.
BC-342-C	"	"	"	75	No	"	"	61.5	
BC-342-D	"	"	"	"	"	No	"	61.5	
BC-342-F	"	"	"	"	"	"	"	61.5	
BC-342-J	"	"	"	"	"	"	"	61.5	
BC-342-L	"	"	"	"	"	"	"	61.5	
BC-342-N	"	"	"	"	"	"	"	61.5	
BC-314	150-1500	4	12-14v D.C.	50- 60	Yes	"	No	63	SELECT. CONTROL (variable selectivity 1st I-F) knob on front panel. This model only.
BC-314-C	"	"	"	"	No	"	"	56	
BC-314-D	"	"	"	"	"	"	"	56	
BC-314-E	"	"	"	"	"	"	"	56	Both phone jacks connected to the output of 2d a-f stage. Antenna disabling relay also grounds 1st audio grid.
BC-314-G	"	"	"	"	"	"	"	56	"
BC-344	"	"	110-120v A.C.	75	Yes	"	"	61.5	SELECT. CONTROL (variable selectivity 1st I-F) knob on front panel. This model only.
BC-344-D	"	"	"	"	No	"	"	61.5	Antenna disabling relay also disables 1st audio. All jacks to 2nd audio.

d. Throughout this manual, where descriptive matter applies equally to all receivers of a series, the suffix letter is omitted and the symbol (*) is used instead; for example, Radio Receiver BC-312-(*). The full type number is used when a particular model must be identified for any reason. The table on page 6 shows the difference between models.

3. Construction.—

The cabinet, the panel, and the inside chassis are made of metal. The internal parts of the receiver are thoroughly shielded by means of metal inclosures as shown in figure 4. The various compartments and cans are clearly marked and are easily identified. Aluminum was used in early models but substitutes have been used in later models. The outside surfaces of the cabinet and the front of the panel are finished in black. The whole panel-chassis assembly slides in and out of the cabinet readily and is locked firmly in place by means of five knurled locking screws of the captive type. Convenient handles are located on the vertical sides of the panel. The over-all dimensions of the receivers are 18 by 9½ by 9 inches. (Figures 1, 2, and 3 show front views of Radio Receivers BC-312-(*), BC-342-(*), and BC-314-(*) respectively. Due to minor variations in design, certain models may vary slightly in appearance from those shown. The front panel of BC-344-(*) is identical in appearance to that of BC-314-(*).)

4. Mounting.—

Mounting FT-162 (shown under receivers in figs. 1, 2, and 3) consists of a metal-alloy plate provided with holes for fastening in a vehicle or on a fixed table or bench. Mounted on soft rubber pads in the four corners of the plate are short studs which engage holes in the bottom of the receiver cabinet. The latter is held on the mounting by slides, which can be pulled forward to release the cabinet. The mounting minimizes the transmission of vibration and shock to the receiver.

5. Weight and Dimensions.—

The weight of the receiver including Mounting FT-162 is 46 pounds in the models using aluminum. The weight of the steel model is 58 pounds for battery types, 61.5 pounds for a-c types. The dimensions of all models are approx. 18 x 10¾ x 9 inches.

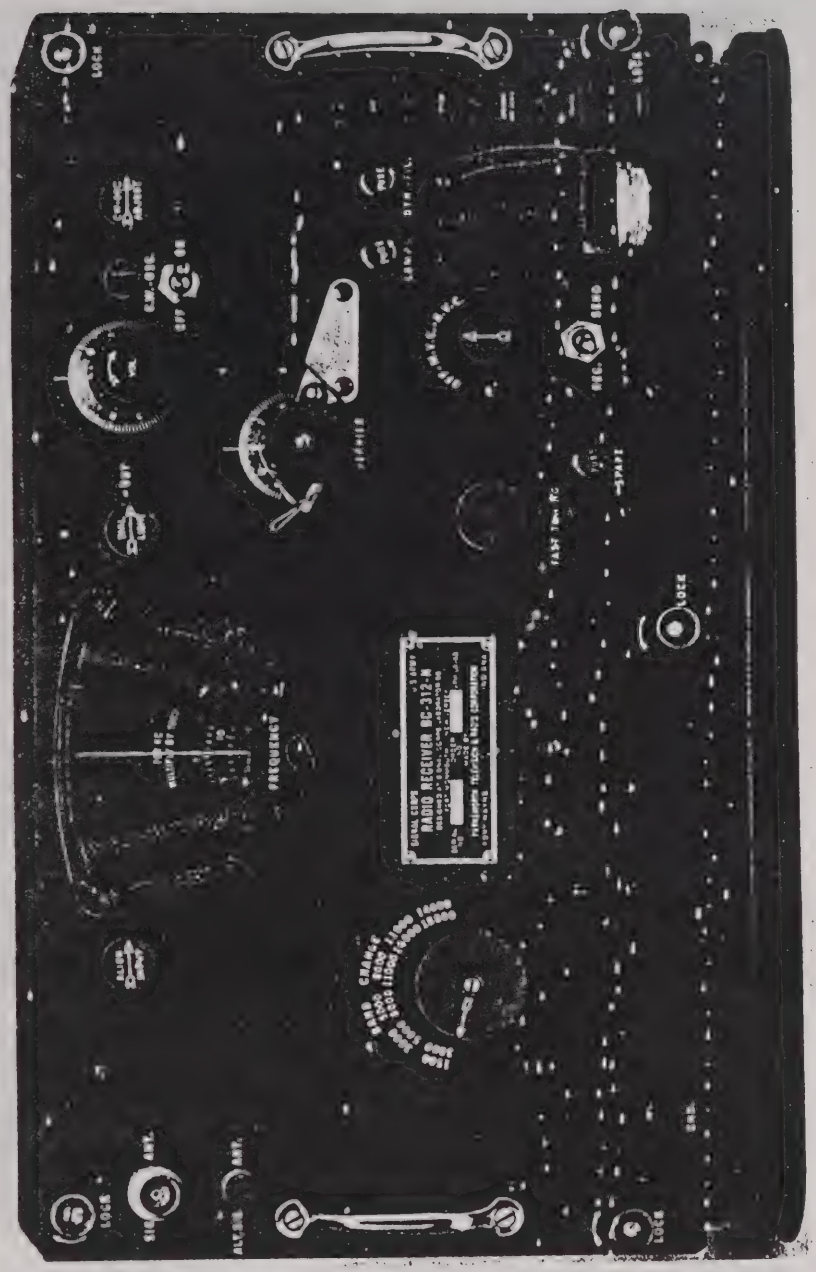

Figure 1.—Radio Receiver BC-312-(*), front panel view. (Certain models of this receiver will vary slightly in appearance due to modification in design.)

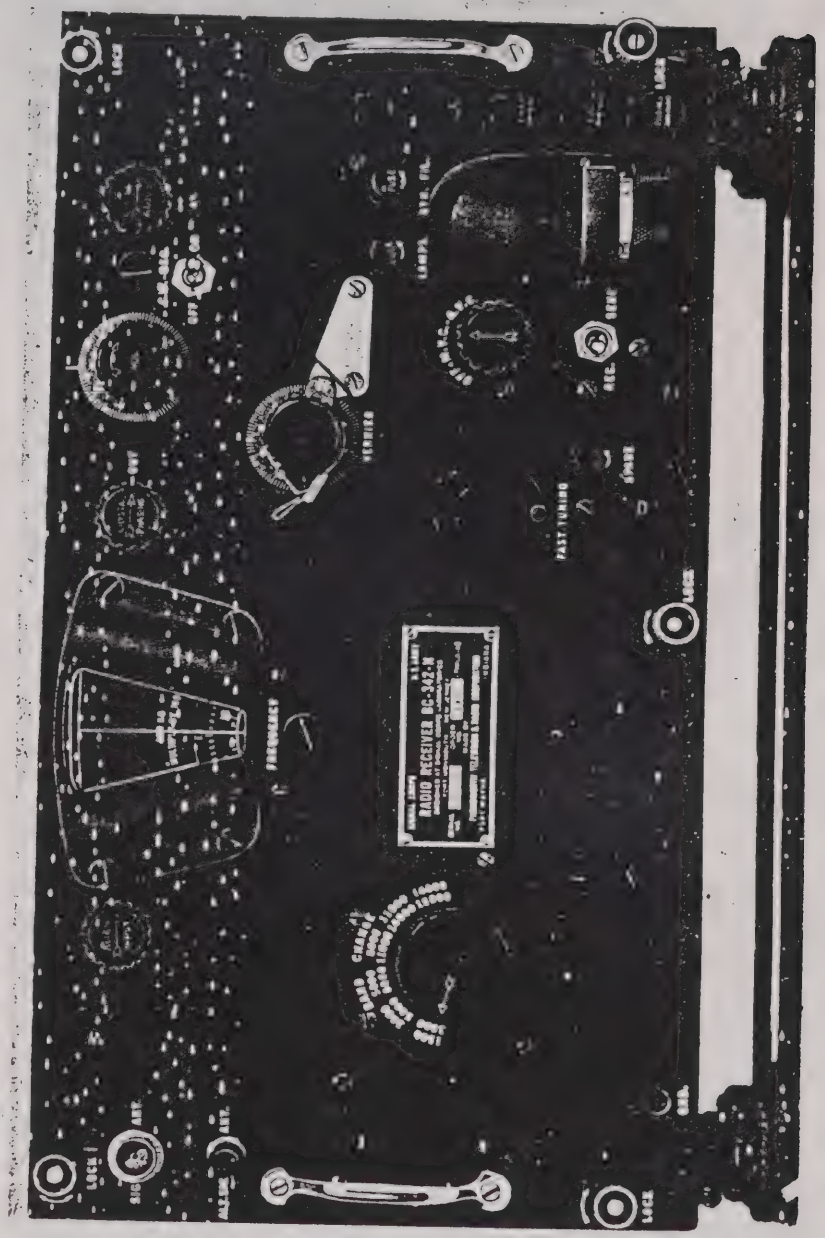

Figure 2.—Radio Receiver BC-342-(*), front panel view. (Certain models will vary slightly in appearance due to modification in design.)

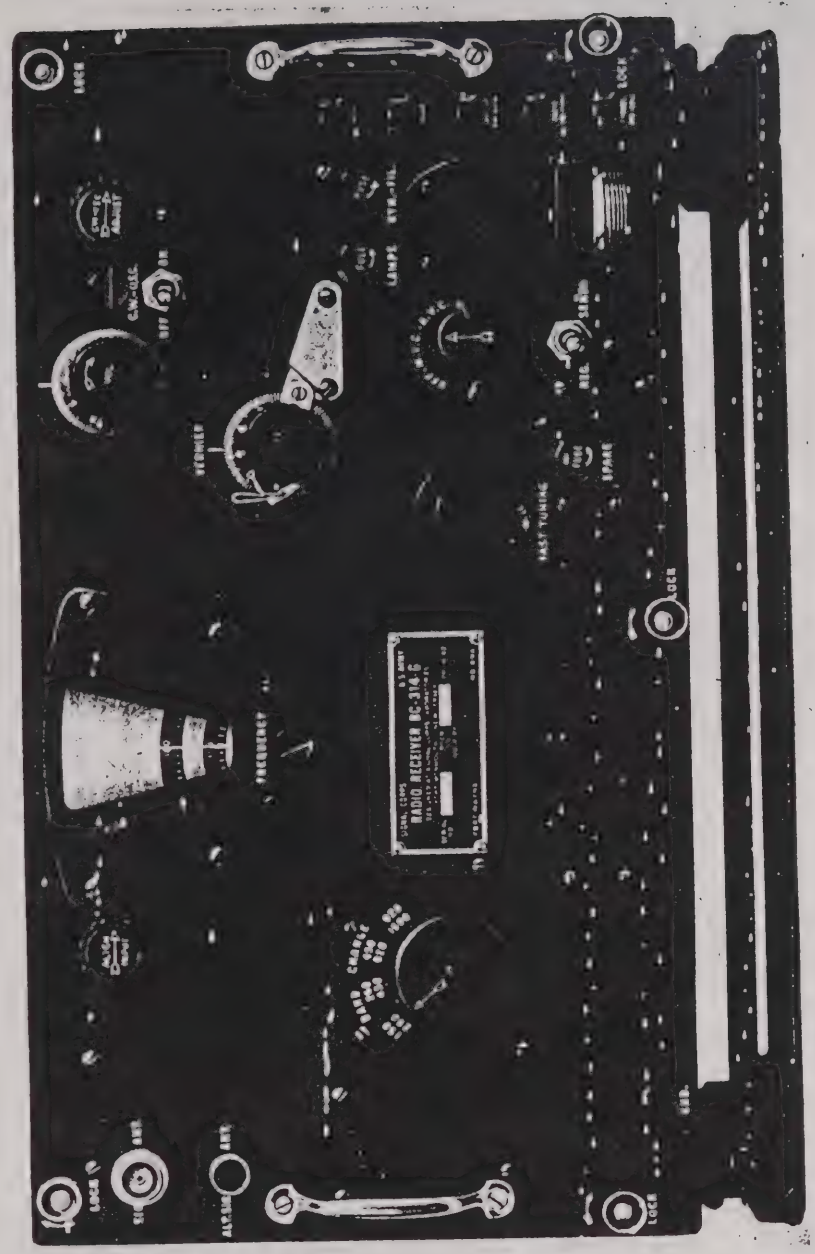

Figure 3.—Radio Receiver BC-314-(*). Receiver BC-344-(*) is identical in physical appearance.

6. Frequency Ranges.—

a. High Frequency Models.—

In these models, the frequency range of 1500 to 18000 kilocycles is covered in six bands, which are selected by means of a positive, rotary switch on the front panel marked BAND CHANGE.

The bands are as follows:

Band	Frequency range (kc)
A	1500 - 3000
B	3000 - 5000
C	5000 - 8000
D	8000 - 11000
E	11000 - 14000
F	14000 - 18000

b. Medium Frequency Models.—

In these models, the frequency range of 150 to 1500 kilocycles is covered in four bands, as follows:

Band	Frequency range (kc)
A	150 - 260
B	260 - 450
C	450 - 820
D	820 - 1500

c. Overlap.—

There is sufficient overlap between bands to provide complete coverage.

d. Tuning Dial.—

The band switch is geared to a shutter on the tuning dial marked FREQUENCY in such a manner that a calibrated scale appears in the dial window for each position of the band switch marked BAND CHANGE. In addition, a uniform scale of 45 divisions remains in view at all times at the bottom of the tuning dial. The tuning capacitor and the dial are geared so that the former goes from one extreme position to the other in 12 revolutions of the knob marked FAST TUNING. Also a part of the tuning gear system is a smaller knob marked VERNIER, which has a calibrated scale of 100 divisions. One revolution of this knob is equal to one of the 45 divisions on the uniform scale of the tuning dial. Very accurate records can therefore be kept of the dial settings for particular frequencies or stations.

Figure 3.—Radio Receiver BC-314-(*). Receiver BC-344-(*) is identical in physical appearance.

6. Frequency Ranges.—

a. High Frequency Models.—

In these models, the frequency range of 1500 to 18000 kilocycles is covered in six bands, which are selected by means of a positive, rotary switch on the front panel marked BAND CHANGE.

The bands are as follows:

Band	Frequency range (kc)
A	1500 - 3000
B	3000 - 5000
C	5000 - 8000
D	8000 - 11000
E	11000 - 14000
F	14000 - 18000

b. Medium Frequency Models.—

In these models, the frequency range of 150 to 1500 kilocycles is covered in four bands, as follows:

Band	Frequency range (kc)
A	150 - 260
B	260 - 450
C	450 - 820
D	820 - 1500

c. Overlap.—

There is sufficient overlap between bands to provide complete coverage.

d. Tuning Dial.—

The band switch is geared to a shutter on the tuning dial marked FREQUENCY in such a manner that a calibrated scale appears in the dial window for each position of the band switch marked BAND CHANGE. In addition, a uniform scale of 45 divisions remains in view at all times at the bottom of the tuning dial. The tuning capacitor and the dial are geared so that the former goes from one extreme position to the other in 12 revolutions of the knob marked FAST TUNING. Also a part of the tuning gear system is a smaller knob marked VERNIER, which has a calibrated scale of 100 divisions. One revolution of this knob is equal to one of the 45 divisions on the uniform scale of the tuning dial. Very accurate records can therefore be kept of the dial settings for particular frequencies or stations.

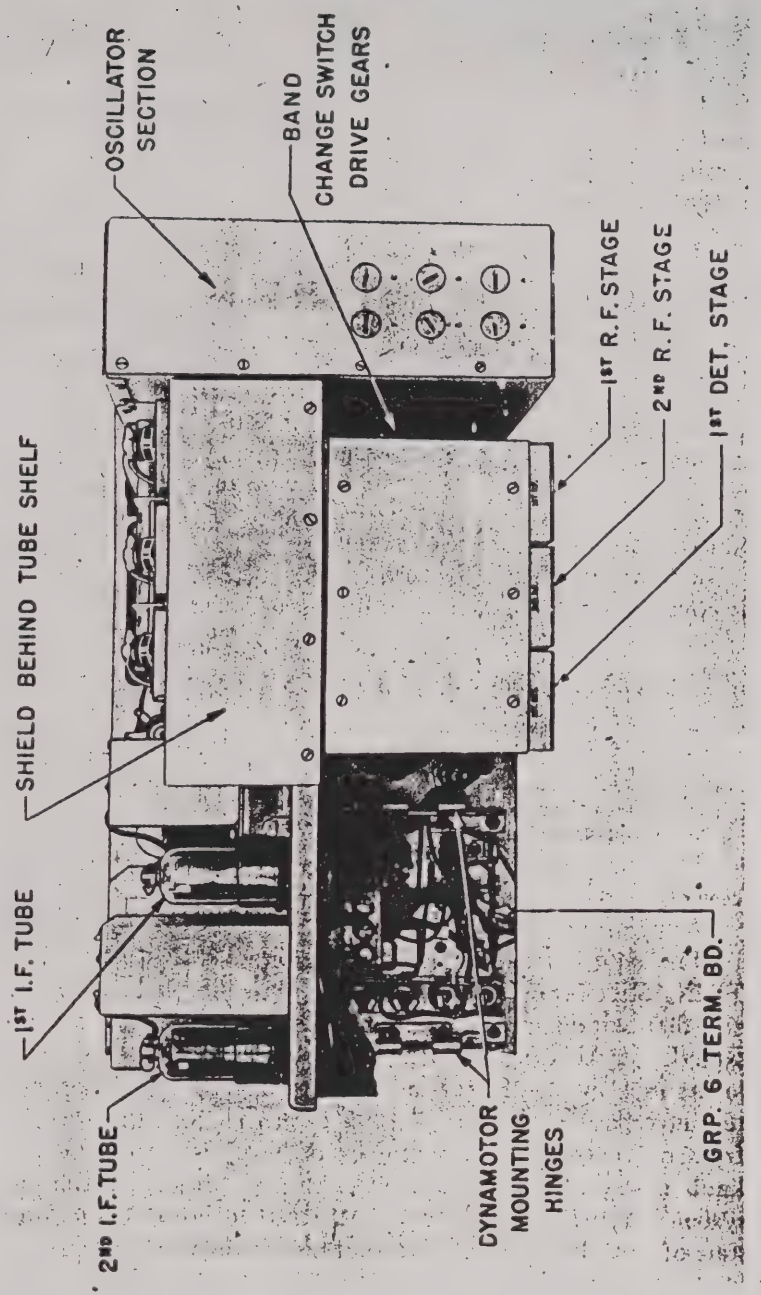

Figure 4.—Radio Receiver BC-312-(*) removed from cabinet. (The BC-312-(*)X, BC-342-(*), BC-314-(*), and BC-344-(*) are similar in appearance.)

7. List of Main Components.—

Each receiver is issued with the necessary vacuum tubes mounted in place. In addition, a complete receiver includes the following:

Radio Receiver BC-312-(*)

1-Dynamotor DM-21-(*) or equivalent.
3-Fuses FU-21-A, 2 installed, 1 spare.
2-Lamps LM-27.
1-Mounting FT-162.

Radio Receiver BC-312-(*)X

1-Dynamotor DM-21-CX or equivelant.
3-Fuses FU-25-A; 2 installed, 1 spare.
2-Lamps LM-42.
1-Mounting FT-162.

Radio Receiver BC-342-(*)

3-Fuses FU-21-A; 2 installed, 1 spare.
2-Lamps LM-27.
1-Mounting FT-162.
1-Rectifier RA-20 (including Fuse FU-27).

Radio Receiver BC-314-(*)

1-Dynamotor DM-21-(*) or equivalent.
3-Fuses FU-21-A; 2 installed, 1 spare.
2-Lamps LM-27.
1-Mounting FT-162.

Radio Receiver BC-344-(*)

3-Fuses FU-21-A; 2 installed, 1 spare.
2-Lamps LM-27.
1-Mounting FT-162.
1-Rectifier RA-20 (including Fuse FU-27).

(See par. 14 for accessory equipment.)

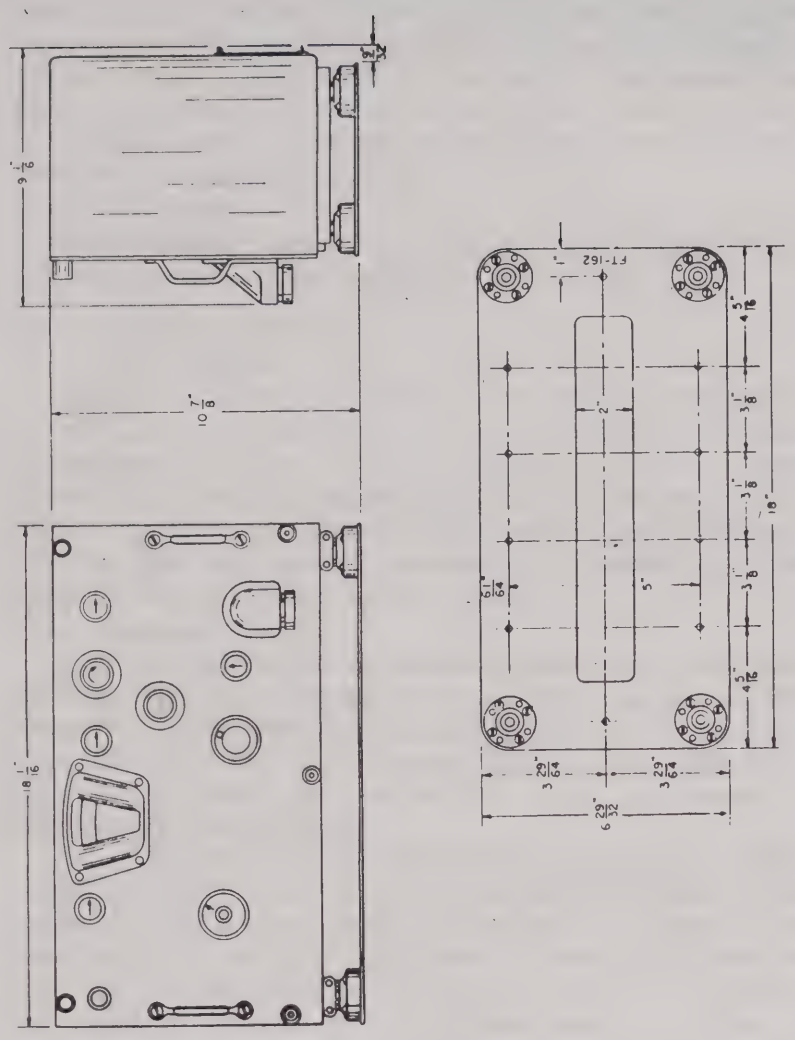

Figure 5.—Outline dimensions of all models.

SECTION II

INSTALLATION AND OPERATION

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Precautions During Operation	12
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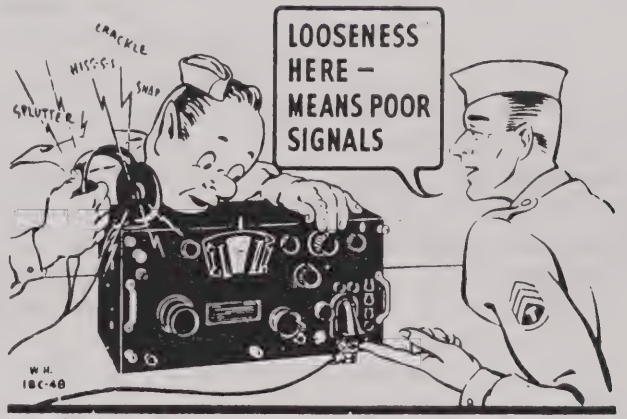
8. Initial Procedure.—

Be careful in unpacking and handling these receivers. After removal from shipping box, examine equipment for damage that may have occured during shipment. If necessary, clean with a soft brush or blower before installation.

9. Installation.—

a. Procedure.—

Install Mounting FT-162 on a substantial support. Add Mounting FT-178 to prevent excessive horizontal movement of receiver on its mounting if it is installed in a vehicle. If a shielded



INSERT PLUGS OF THE PL-114 TYPE FULLY BEFORE YOU TIGHTEN THE KNURLED RING

antenna lead is used, connect it to the shielded antenna binding post. When the antenna lead is not shielded, the ALT-SIG-ANT post may be used. In Receivers BC-312-(*), BC-312-(*)X and BC-314-(*) insert the power cord plug in Socket SO-94 located on the lower right of the front panel. Be sure that the plug is

pushed in all the way before tightening the knurled ring. In Receivers BC-342-(*) and BC-344-(*) insert the power plug into the receptacle of the rectifier at the back of the cabinet. This receptacle normally is covered with a plate held by two screws. The plate can be removed and refastened to the case next to the power receptacle by means of the two screws. Insert a headset plug in either of the jacks marked PHONES.

b. Final Check.—

Before applying power to the receiver, carefully check cording and wiring and study paragraph 11, OPERATION.

10. Preparation For Use.—

a. Pilot Lamps.—

In Receivers BC-312-(*), BC-342-(*), BC-314-(*) and BC-344-(*) install two pilot Lamps LM-27 in the sockets underneath the reflector. In Receiver BC-312-(*)X install two pilot Lamps LM-42 in the sockets. The reflector is part of the assembly on the front panel of the receivers which contains the dial window. The two pilot lamps may be inspected after removing the four screws holding the reflector to the front panel.

b. Vacuum Tubes.—

(1) These receivers are ordinarily issued with tested radio tubes installed. The tubes should not be interchanged or removed unless they become defective; changing them may cause misalignment. Except for the radio-frequency and continuous-wave oscillator, all tube sockets are accessible when the receiver chassis has been removed from its cabinet.

(2) To reach the continuous-wave oscillator tube socket, remove the screw at the top of the continuous-wave oscillator compartment and the screw about halfway down the center of the right side of the oscillator compartment. *Loosen, but do not remove,* the screw at the bottom of the rear and halfway down the left side of this compartment. Lift off the compartment cover.

(3) To reach the tube socket in the radio-frequency oscillator compartment, loosen the two screws near the top of the right side of this compartment, then lift the hinged cover occupying the rear third of the top of this compartment. Check the tubes with tube checker such as the one in the Test Set I-56 series.

c. Line Voltage Compensation (On BC-342-(*) and BC-344-(*) only).—

Remove the receiver from the cabinet and turn it upside down

so that the terminal strip near the rectifier is accessible. If prevailing line voltage, measured across terminals 1 and 4 of the terminal strip, is below 115 volts, change the input lead to the rectifier unit. *Loosen, but do not remove,* the two screws on opposite sides of the rectifier cover; remove the two screws at the outside edge of the rectifier unit, and remove the cover. This will expose the rectifier terminal board and the line-voltage compensating taps. Unsolder wire attached to the compensating tap marked 120V, and solder it to that marked 110V. After making this change, replace rectifier cover.

d. Fuses.—

The fuses marked LAMPS and DYN-FIL on the front panel of Radio Receivers BC-312-(*), BC-314-(*), BC-342-(*) and BC-344-(*) are Fuses FU-21-A. Check for continuity and for proper rating (10 amperes) before installation. Fuses FU-25-A are used in these positions in Receiver BC-312-(*)X only and are rated at 5 amperes. Fuse FU-27, in Rectifier RA-20 of Receivers BC-342-(*) and BC-344-(*), can be reached from the rear of the receiver cabinet. Check for continuity and for proper rating (2 amperes).

11. Operation.—

a. Panel Controls.—

(1) *Radio Frequency Tuning.—*

On high frequency models the main tuning dial is of the flat disk type carrying seven scales, six of which are calibrated in kilocycles and one in 45 equal divisions. On medium-frequency models, the main tuning dial is also of the flat disk type but carries five scales, four of which are calibrated in kilocycles and one calibrated in 45 equal divisions. The dials in these radio receivers can be revolved through an arc of about 300° by either of two controls on the front panel. FAST TUNING control provides for a 25 to 1 reduction. VERNIER control provides for a 90 to 1 reduction and carries a scale marked with 100 equal divisions which can be used to interpolate the 0-45 scale of the main dial. Two dial lights illuminate the main dial. A masking plate rotates with the band changing mechanism and covers all portions of the dial, except the 0-45 scale and the scale of the particular frequency band selected.

(2) *Band Changing.—*

The BAND CHANGE control operates switches located in

the radio-frequency oscillator, first radio-frequency stage, second radio-frequency stage, and first detector (mixer) stage compartments. It also operates the masking plate mentioned above. All unused coils are short-circuited.

(3) *OFF-MVC-AVC Switch.*—

The OFF-MVC-AVC switch permits the use of manual or automatic volume control. This control also serves as the power ON-OFF switch when the control switch in Rectifier RA-20 of Receivers BC-342-(*) and BC-344-(*) is on, and is the only ON-OFF switch on Receivers BC-312-(*), BC-312-(*)X, and BC-314-(*).

(4) *Antenna Alignment Control.*—

The ALIGN INPUT control permits tuning a 50 to 200-$\mu\mu$f antenna to resonance in high-frequency models. In medium-frequency models, it permits tuning a 250 to 1000-$\mu\mu$f antenna to resonance.

(5) *Continuous-wave Oscillator Control.*—

The CW-OSC OFF-ON switch controls the use of the continuous-wave oscillator. Another control, CW-OSC ADJUST, allows variation in the pitch of the received signal.

(6) *Crystal Filter Control.*—

CRYSTAL PHASING control which permits the use of a crystal filter is incorporated in Receivers BC-342-(*), BC-312 to BC-312-J inclusive, and BC-312-HX. The filter is in the circuit at all settings of this control except at OUT. The purpose of the crystal filter is to increase the selectivity of the receiver.

(7) *Volume Control.*—

The VOL knob operates a dual potentiometer for control of volume. Using MVC it controls the receiver sensitivity; using AVC it controls audio-frequency gain.

(8) *Input Binding Posts.*—

In order to connect the antenna to the receiver, all sets have two antenna binding posts, one marked SIG ANT and the other ALT SIG ANT, except for BC-312 which has three, SIG ANT, ALT SIG ANT, and NOISE ANT. One of these posts, SIG ANT, is shielded and is used when the antenna is connected to the receiver through a shield lead. All sets have a ground post marked GND. This should be connected to a good ground (six foot metal stake driven in damp earth or to frame of vehicle in which set is installed).

(9) *Pilot Lamp Dimmer Control.*—

Receivers BC-312-L-M-N and NX have controls which adjust the brightness of the pilot lamps LM-27 and LM-42. These controls are located in the same position as the CRYSTAL PHASING control on the panel of receivers equipped with the crystal filter. Turning this knob (marked DIAL LIGHT) to the left dims the pilot lamps.

(10) *Send-receive Switch.*—

When the receivers are used with a transmitter and associated cording (as in Radio Set SCR-245- series), the REC-SEND switch at SEND position connects a relay through the key jack. This relay short circuits the antenna and grid of the first audio tube to ground when the key is depressed. (In Receivers BC-312 to BC-312-J, BC-342 to BC-342-J and in Receivers BC-314 to BC-314-D and BC-344 the audio grid is not grounded.)

(11) *Fuses.*—

Fuse holders are mounted on the front panel so that the fuses may be easily replaced. The LAMPS fuse protects the circuit of the dial lamps. The DYN-FIL fuse protects the circuit supplying the filaments and power to the dynamotor. The SPARE fuse replaces either of the other two fuses when necessary. In addition to the above, there is a 2-ampere, 250-volt fuse in Rectifier RA-20, which can be reached from the rear of the cabinet in Receivers BC-342-(*) and BC-344-(*).

(12) *Panel Jacks.*—

The jacks on the front panel are as follows:

(*a*) KEY - To connect a telegraph key when the receiver is used with a transmitter (as in Radio Set SGR-245- series).

(*b*) MICRO - To connect a microphone for voice transmission when the receiver is used with a transmitter (as in Radio Set SCR-245- series).

(*c*) SPEAKER 2D AUDIO - To connect a permanent-magnet type loudspeaker.

(*d*) PHONES 2D AUDIO - To use a headset with the receiver, insert a headset plug into jack.

(*e*) PHONES 2D AUDIO - This jack is connected in parallel with the jack above it and is used for the same purpose.

NOTE: In sets BC-312 to and including BC-312-J, BC-342 to and including BC-342-J, BC-314 to BC-314-D and BC-344, this

jack is marked PHONES 1ST AUDIO and connects headsets to output on first audio stage. In later model receivers of all types, provisions have been made for connecting headsets having an impedance of either 4000 or 250 ohms by a wiring change to the phone jacks. This change in wiring is to be made by operating personnel. A reversible tag indicates the correct output impedance.

(13) *Power Socket.*—

For Receivers BC-312-(*), BC-312-(*)X, and BC-314-(*) connections to the d-c source of the proper potential are made as follows: Connect the proper power cord terminated by Plug PL-114 to Socket SO-94, mounted on the front panel of the receiver. Push the plug all the way into the socket before tightening the knurled ring. (On Receivers BC-342-(*) and BC-344-(*) this socket has a cap which may be removed if necessary. For power connections of these receivers, see paragraph 11j.)

(14) *Panel Locks.*—

Panel locks are provided to secure the chassis of the receivers in the cabinet. By turning the five straight knurled knobs clockwise, the receiver panel is pressed firmly against the rubber gasket. To remove the receiver from its cabinet, these lock-knobs must be turned counter-clockwise as far as they will go.

(15) *Noise-balancing Control.*—

(*a*) In Receivers BC-312, BC-312-A, BC-312-C, BC-342, and BC-342-C, a noise-balancing system is provided. This operates only on the 1500-3000 and 3000-5000 kilocycle bands. It is intended to reduce ignition interference when the receiver is part of an installation in a vehicle; it is not used when the receiver is part of a portable or semifixed radio set. This system is rather critical in adjustment. On later procurements the noise balancing feature has been eliminated.

(*b*) If the receiver is in a vehicle and ignition noise is troublesome, proceed as follows: Turn the BAND CHANGE knob to either of the above-mentioned frequency ranges. With the regular set antenna connected, but with the NOISE ANT post idle, turn the VOL knob to about 6. Adjust the control marked NOISE ADJUST for *maximum* noise output. Disconnect the signal antenna. A special noise antenna is required. This consists merely of a length of shielded wire. Connect one end to the NOISE ANT post on the receiver. Leave the other end open with one foot of the shielding removed and hang it in the engine compartment of

the vehicle without touching any live part of the ignition wiring. Adjust the NOISE BALANCE control for *maximum* noise output. This should be equal to the noise received with the signal antenna. If the noise outputs are not equal, relocate the pick-up end of the noise antenna until they are. Connect both antennas. Adjust the NOISE ADJUST and NOISE BALANCE controls until the *minimum* noise output is secured.

(*c*) If repeated trials with the noise antenna in different locations do not effect a noticeable reduction of noise, remove the antenna and discontinue the experiments.

b. Source of Power.—

(1) In Receivers BC-312-(*) and BC-314-(*) a 12 to 14 volt battery is required. Receivers BC-312-(*)X requires a 24 to 28 volt battery. A power cord fitted with Plug PL-114 is required. Plug PL-114 fits into panel Socket SO-94 (SO_1), and the cord must be long enough to reach the battery. The only connections that must be made are to the heavy prongs of the plug-socket combination; the other prongs are used for control purposes. When the receiver is part of radio set installation, consult the cording diagram of the particular radio set to determine the exact hook-up. This will be found in the technical manual or instruction book for the set. In the case of the a-c receivers (BC-342-(*) and BC-344-(*)), connect the a-c cord to a 110-volt outlet. Disregard the Socket SO-94 (SO_1) since in a-c receivers its connections are used only for control purposes.

(2) The a-c receivers of this series are designed to operate on 110- to 120-volt, 50 to 60 cycle, a-c power. They will be damaged if used on higher voltages or on 25-cycle, a-c power. The primary of the power transformer of Rectifier RA-20 has taps for 110 and 120 volts. Check the line voltage with an a-c voltmeter. Use the 110 volt tap for voltages below 115 volts and the 120 volt tap for voltages above 115 volts. Seldom is trouble found from excessively high voltages; usually the voltage is likely to be low, especially at night. If the voltage does run consistently high, connect a dropping variable resistor in the line and adjust it to the correct value. A suitable unit for this purpose is a 250 ohm, 200 watt, ceramic core wire wound resistor.

(3) The a-c receivers cannot be used on 25-cycle power, generated in some large industrial areas and in the Panama Canal Zone.

NOTE: Be certain that the *correct source of power of proper voltage is applied* to the receiver being used.

c. To Turn On Receivers.—

(1) To turn on power in Receivers BC-342-(*) and BC-344-(*), plug in the power cord and throw the a-c power switch at the rear of the cabinet to ON. Now turn the OFF-MVC-AVC switch to either MVC or AVC.

(2) To turn on power in Receivers BC-312-(*), BC-312-(*)X, and BC-314-(*) turn OFF-MVC-AVC switch to either MVC or AVC.

d. To Turn Off Receivers.—

Turn the OFF-MVC-AVC switch to OFF.

e. To Select Different Modes of Operation.—

With receivers operating, use the following procedure:

(1) *Continuous-wave (c-w).*—

Turn the OFF-MVC-AVC switch to MVC. Throw the CW-OSC OFF-ON switch to ON.

(2) *Tone or Voice.*—

Turn the OFF-MVC-AVC switch to AVC. Throw the CW-OSC OFF-ON switch to OFF.

f. To Tune in a Signal.—

Use BAND CHANGE control to select the frequency band which covers the frequency of the signal to be received. Using FAST TUNING control, tune to the approximate frequency of the signal. Adjust ALIGN INPUT control for maximum noise level. This assures maximum receiver sensitivity. Use the control marked VERNIER to tune in the signal. Adjust VOL control for desired volume level. Turning this control to the right increases the volume; placing OFF-MVC-AVC switch at AVC tends to maintain volume at a constant level as determined by the setting of VOL. AVC is used primarily for reception of voice signals. The proper setting of this control is therefore determined by the character of the signal received.

g. To Change Frequency.—

To change frequencies it is necessary to tune to the new frequency in the manner described in paragraph 11*f*. Advance VOL control and rotate the tuning dial slowly to avoid passing over a weak signal without hearing it.

h. To Control Sensitivity.—

The sensitivity of the receiver is affected by controls ALIGN

INPUT, VOL., CRYSTAL PHASING (on receivers so equipped), and OFF-MVC-AVC. To obtain maximum sensitivity, adjust the control marked ALIGN INPUT to secure the maximum noise output from the receiver, turn the control marked VOL as far as possible to the right. When reception is particularly noisy, weak signals may be read more easily if VOL is rotated to a lower setting. CRYSTAL PHASING control (on receivers so equipped) should be at OUT and OFF-MVC-AVC control at MVC.

i. To Control Selectivity.—

Receivers BC-312 to BC-312-J and BC-342-(*) use a crystal filter in the intermediate-frequency amplifier circuit. Turn the CRYSTAL PHASING control away from OUT to increase the selectivity of the receiver. (The operation of this control also decreases sensitivity.) The CRYSTAL PHASING control is intended for use primarily in reception of continuous-wave signals. When tuning voice signals, it may increase the selectivity of the receiver to such a degree as to distort them. However, in receiving a voice signal with very heavy background noise, or a voice signal which is very much distorted, it may be found that proper operation of CRYSTAL PHASING control will improve the clarity of the signal. Experiment with the use of this control on various types of signals in order to determine what may be expected from its operation.

j. To Change The Pitch Of A Continuous-wave Signal.—

The pitch of a continuous-wave signal may be changed either by operating VERNIER control (which changes the tuning of the receiver) or by operating the CW-OSC ADJUST control. The latter control permits a change in pitch of the signal without changing the tuning of the receiver. Once a signal has been satisfactorily tuned in, it will usually be better to make desired changes in signal pitch by means of CW-OSC ADJUST control.

k. Power Connection and Control of Receivers BC-342-(*) and BC-344-(*).—

(1) *A-C Power Socket.*—

A-C power connections are made to a receptacle located in Rectifier RA-20 which is accessible from the rear of the receiver chassis.

(2) *A-C Power Switch.*—

This switch is located in Rectifier RA-20 and is accessible from the rear of the receiver. It controls the power input to the receiver.

After this switch is closed the receiver power is controlled entirely by the OFF-MVC-AVC switch located on the front panel.

l. Power Units For Various Receivers.—

Receiver	Power Unit	Primary Power
BC-312-(*)	DM-21-(*)[2]	12-14 v. d.c.
BC-312-(*)X	DM-21-CX	24-28 v. d.c.
BC-314-(*)	DM-21-(*)	12-14 v. d.c.
BC-342-(*)	RA-20	110-120 v. 60-cycle a.c.
BC-344-(*)	RA-20	110-120 v. 60-cycle a.c.

12. Precautions During Operation.—

a. General.—

BE CAREFUL WHEN HANDLING CONTROLS OF THESE RADIO RECEIVERS. MOST OF THE CONTROLS ARE EQUIPPED WITH STOPS TO LIMIT THE EXTENT TO WHICH THEY MAY BE TURNED. FORCING ANY CONTROL BEYOND ITS NORMAL STOP WILL CAUSE SERIOUS DAMAGE. THIS CAUTION APPLIES PARTICULARLY TO THE CONTROLS MARKED BAND CHANGE AND CRYSTAL PHASING.

b. Power Cords.—

Before removing the receiver chassis from the cabinet, always disconnect the power cord from the power source.

c. Band Change.—

In changing frequency bands, the band change switch may be accidentally stopped between connection points. Make certain that *this control is turned until it positively engages the contact point* for the desired band.

13. Field Maintenance.—

Servicing this equipment in the field consists, almost entirely, of the replacing of tubes, pilot light bulbs and fuses, and making minor repairs. Alignment and major adjustment or repair will be done *only* by authorized Signal Corps repair units of trained personnel, who are adequately supplied with the necessary tools and equipment.

[2]DM-17-A is interchangeable with this unit and was issued with earlier models.

14. Accessory Equipment.—

a. The following items, *not* necessarily included as parts of the receivers, are required to operate them:

(1) *Receiver BC-312-(*).—*

1 Power Cord with Plug PL-114
1 Headset HS-30- series and cords CD-604 and CD-307-A, or cord CD-605[3]
2 Tubes VT-65
1 Tube VT-66
4 Tubes VT-86
1 Tube VT-87
1 Tube VT-88
Antenna
Source of Power (12-14 volts d-c)

(2) *Receiver BC-312-(*)X.—*

1 Power Cord with Plug PL-114
1 Headset HS-30- series and cords CD-604 and CD-307-A, or cord CD-605[3]
2 Tubes VT-65
4 Tubes VT-86
1 Tube VT-87
1 Tube VT-88
1 Tube VT-134
Antenna
Source of Power (24 - 28 volts d-c)

(3) *Receiver BC-314-(*).—*

1 Power Cord with Plug PL-114
1 Headset HS-30- series and cords CD-604 and CD-307-A, or cord CD-605[3]
2 Tubes VT-65
1 Tube VT-66
4 Tubes VT-86
1 Tube VT-87
1 Tube VT-88
Antenna
Source of Power (12-14 volt d-c)

[3]If Headset HS-30- series with proper cords or cord is not available, Headset P-19 may be used.

(4) *Receiver BC-342-(*).*—

1 Cord CD-370, or equivalent (a-c input)
1 Headset HS-30- series and cords CD-604 and CD-307-A, or cord CD-605[3]
2 Tubes VT-65
1 Tube VT-56
4 Tubes VT-86
1 Tube VT-87
1 Tube VT-88
1 Tube VT-97
Antenna
Source of Power (110-120 volts a-c)

(5) *Receiver BC-344-(*).*—

1 Cord CD-370, or equivalent (a-c input)
1 Headset HS-30- series and cords CD-604 and CD-307-A, or cord CD-605[3]
2 Tubes VT-65
1 Tube VT-66
4 Tubes VT-86
1 Tube VT-87
1 Tube VT-88
1 Tube VT-97
Antenna
Source of Power (110-120 volts a-c)

b. Antenna.—

(1) *Types.*—

When an antenna is not included as part of the equipment the following antennas can be used. For optimum high-frequency reception (from 10 mc and higher) use an antenna about 50 feet long, including lead-in. For optimum medium-frequency reception use an antenna about 100 feet long, including lead-in. For optimum low-frequency reception (BC-314-(*) and BC-344-(*)) use an antenna about 50 feet long including lead-in.

NOTE: The above antennas can be installed either indoors or outdoors, but outdoors is preferable. The knob on panel ALIGN INPUT (Capacitors C_{26} or C_1, par. 16) permits tuning the antenna to resonance at various frequencies. See paragraphs 11*a* (4) and 11*f*.

[3]If Headset HS-30- series with proper cords or cord is not available, Headset P-19 may be used.

(2) *Antenna installation precautions.*—

Install antenna as high as possible. Keep away from power and telephone lines, metal and metal-roofed buildings, trees, heavy foliage, electric motors and devices, etc. Insulate each end of the antenna.

SECTION III
FUNCTIONING OF PARTS

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15. General Circuit.—

Receivers BC-312-(*), BC-312-(*)X, BC-314-(*), BC-342-(*) and BC-344-(*) are of the multi-band, integral-coil, superheterodyne type. Metal tubes are used throughout, although "GT" type tubes may be used in the first intermediate-frequency amplifier, second intermediate-frequency amplifier and second detector-first audio amplifier stages. Figure 6 shows a functional circuit diagram of Receivers BC-312-(*), BC-312-(*)X and BC-342-(*); figure 7 is a functional circuit diagram of Receivers BC-314-(*) and BC-344-(*) showing the connections set up by the BAND CHANGE switch to receive a signal in one particular frequency band. (The crystal filter circuit used in some models is shown in figure 10.) In these functional diagrams the BAND CHANGE switch and all coils and capacitors not essential to the operation on that band are omitted for the sake of clarity. These receivers employ two stages of pentode radio-frequency amplification, a first detector (pentagrid mixer) stage, and a separate triode radio-frequency oscillator (H.F.O.); they also employ two stages of pentode intermediate-frequency amplification; a duplex diode-triode second detector, AVC rectifier, first stage of audio frequency; a separate stage of pentode audio-frequency. A separate triode oscillator (B.F.O.) is provided to produce a beat note for continuous-wave reception.

The two radio-frequency stages provide selectivity and high sensitivity and tend to reduce possible interference from

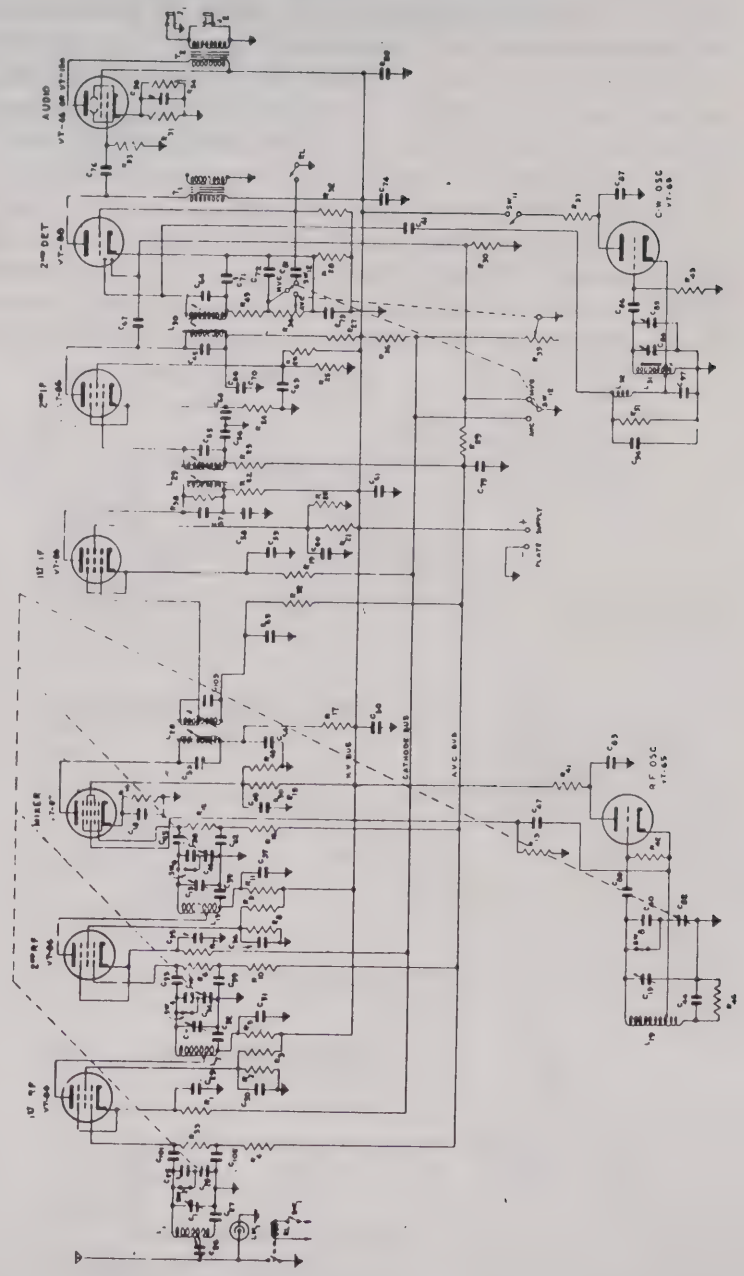


Figure 6.—Functional circuit diagram of BC-312-(*), BC-312-(*)X, and BC-342-(*), MVC operation. For crystal filter diagram see figure 10.

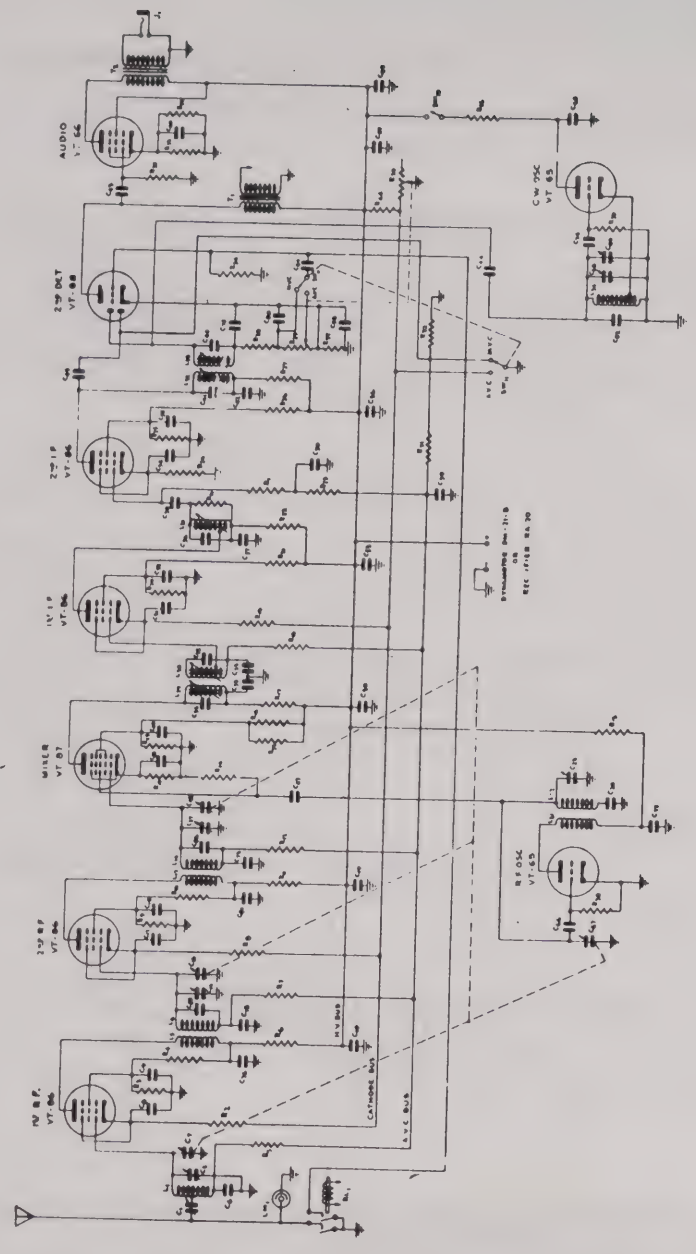


Figure 7.—Functional circuit diagram of BC-314-(*) and BC-344-(*)

signals occuring at either the intermediate frequency or at the image frequency. The mixer tube circuit with its associate oscillator converts the frequency of the received signal to that at which the intermediate-frequency amplifier is tuned. The intermediate-frequency stages provide additional selectivity and amplification. The second detector stage demodulates the amplified signal to audibility. The audio-frequency stage provide additional amplification. The c-w oscillator, generates a signal slightly different in frequency from that to which the intermediate-frequency stages are tuned. When these signals are mixed they produce an audible signal adjustable in pitch for receiving continuous wave signals.

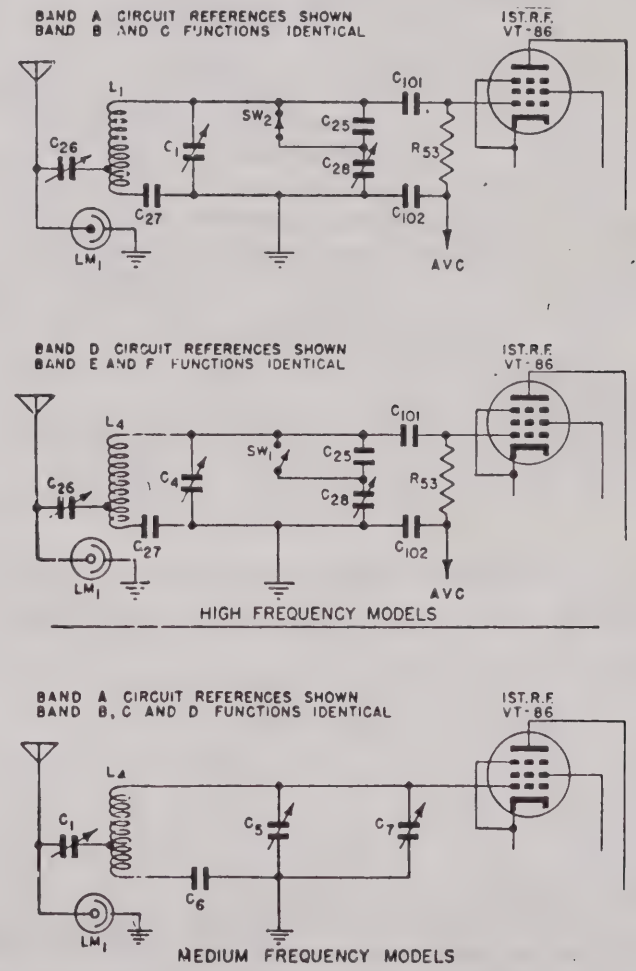


Figure 8.—Antenna circuit, all models.

16. Antenna Circuit (figs. 6, 7, and 8).—

The ALIGN INPUT knob on the front panel controls capacitor C_{26} in Receivers BC-312-(*), BC-312-(*)X, and BC-342-

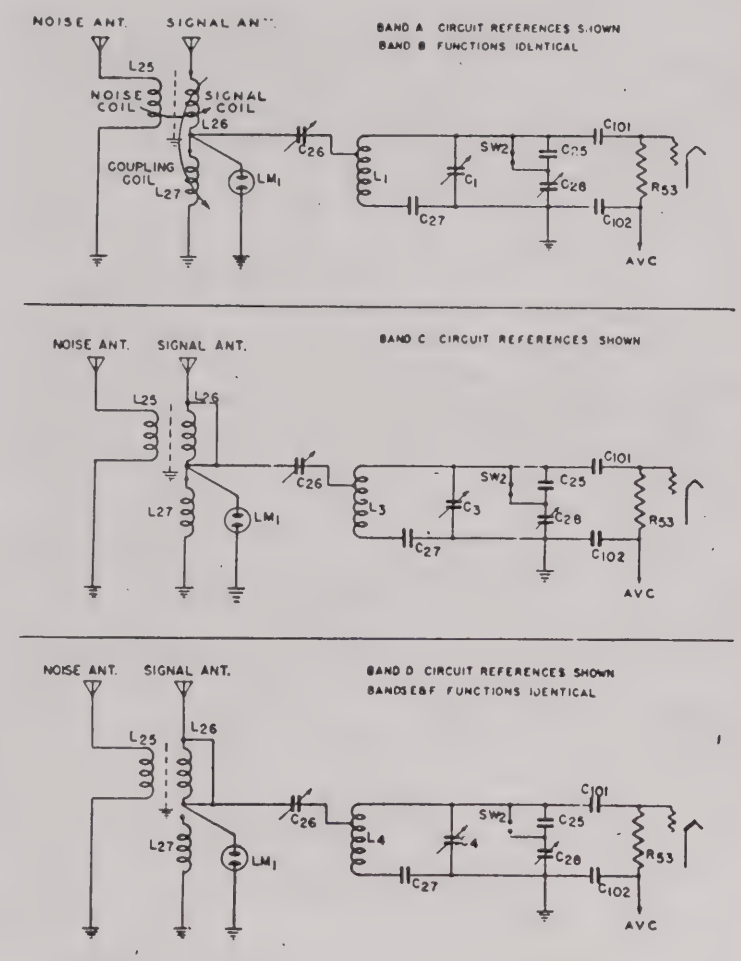


Figure 9.—Antenna noise-suppression circuit as used in BC-312, BC-312-A, BC-312-C, BC-342, and BC-342-C.

(*) and capacitor C_1 in Receivers BC-314-(*) and BC-344-(*). These capacitors permit tuning the antenna circuit to resonance with an incoming signal. The neon lamp LM_1, which is connected

between the antenna and ground, normally has a very high resistance. When a certain threshold voltage is exceeded, the lamp becomes a conductor by ionization and prevents further rise in voltage by by-passing the current to ground. It is used in this circuit to protect the receivers from any excessive voltage which might be applied to the antenna. In Receiver BC-312, BC-312-A, BC-312-C, BC-342, and BC-342-C, a *noise-suppression circuit* is included in the antenna circuit (figure 9.) In the noise-suppression circuit there are three coils L_{25}, L_{26}, and L_{27}, which when properly adjusted, tend to reduce motor ignition interference. L_{25} is coupled to L_{26}, an electrostatic shield being provided to insure that this coupling is entirely magnetic. This coupling is also adjustable. The coupling between L_{26} and L_{27} is primarily electrostatic; the necessary magnetic shield is provided to insure that this type of coupling is secured. The coupling between L_{26} and L_{27} is also adjustable. An adjustment on the front panel marked NOISE BALANCE controls the coupling between L_{26} and L_{25} and serves to adjust the amount of noise introduced into the receiver circuits from the noise antenna. The coupling between L_{27} and L_{26} is controlled by the NOISE ADJUST control and determines the phase relationship of the resultant noise voltage introduced into the receiver. The coupling between L_{25} and L_{26} is adjusted to produce minimum noise (not always zero). L_{27} is then varied to reduce the noise to zero, thereby insuring that the phase of the noise fed by the separate antennas results in cancellation. L_{27} also acts as a radio-frequency choke between antenna and ground.

17. Radio-Frequency Circuits (figs. 6 and 7).—

a. Receivers BC-312-(*), BC-312-(*)X and BC-342-(*).

In Receivers BC-312-(*), BC-312-(*)X, and BC-342-(*), the circuits of the first radio-frequency amplifier, second radio-frequency amplifier, and mixer stages are very nearly identical. They are designed to permit tuning with three sections of a four gang capacitor. The screen voltages for the tubes in the aforementioned stages are provided by voltage dividers connected between B+ and ground. Resistors R_2 and R_3, R_8 and R_9, and R_{48}, R_{15}[4] and R_{50}[4] form these voltage dividers. Each of the three screens is separately bypassed to ground by its own capacitor C_{30}, C_{36}, and C_{49} respectively. For MVC operation, cathode bias for the two

[4]These two resistors are in parallel.

radio-frequency tubes is partly fixed and partly variable. The fixed bias is derived from the drop across R_1 and R_7. The variable bias value is provided by means of a voltage divider formed by R_{36} and variable resistor R_{35}. These latter resistors are connected between B+ and ground, so that a change in the value of R_{35} will cause a change in the cathode bias. R_{35} is shorted to ground for automatic volume control (AVC) operation so that the cathode biases of the first radio-frequency and second radio-frequency tubes are provided entirely by the drop across R_1 and R_7. The cathode bias for the mixer tube is derived from the drop across R_{14} and is not variable. The injector grid bias for the mixer tube is secured by means of resistors R_{13} and R_{14}. All cathodes have their own separate bypass capacitors, C_{29}, C_{35} and C_{48}. Capacitors C_{33} and C_{45} keep the d-c voltages from being impressed on the grids of the second radio-frequency and mixer tubes. There is a blocking capacitor C_{101} in the first radio-frequency stage to make the grid circuit identical with those of the two succeeding stages. Coils L_1, L_7, and L_{13} are the tank inductances for the grid circuits of the first radio-frequency, second radio-frequency, and mixer stages respectively. These tank inductances are tuned by a ganged capacitor consisting of C_{28}, C_{34}, and C_{46}. In series with these sections are three capacitors, C_{25}, C_{100}, and C_{38}, across each of which is placed a shorting switch, SW_2, SW_4, and SW_6 respectively, operating with the band change mechanism. These shorting switches permit the series capacitors to be used in the three highest frequency bands to obtain greater frequency spread on the dial, and short them in the three lowest frequency bands. Trimmer capacitors C_1, C_7, and C_{13} are provided to permit individual alignment of the three circuits. Radio-frequency blocking capacitors C_{32} and C_{39} are used to prevent shorting the plate supplies of the first and second radio-frequency tubes to ground. AVC circuits (par. 23 b) contain resistor-capacitor network filters. Decoupling networks, consisting of resistors and capacitors, are inserted in all plate supply leads to remove any radio-frequency which might be fed back into the power supply.

b. Receivers BC-314-(*) and BC-344-(*).—

In Receivers BC-314-(*) and BC-344-(*) the first radio-frequency amplifier, second radio-frequency amplifier, and mixer stages also are designed to permit tuning with three sections of a four-gang capacitor. The screen voltages for the tubes in the above

mentioned stages are provided by voltage dividers connected between B+ and ground. Resistors R_3 and R_4, R_9 and R_{10}, R_{16}[5], R_{53}[5] and R_{45} form these voltage dividers. Each screen is separately bypassed to ground by its own capacitor, either C_9, C_{18} or C_{49}. For MVC operation, cathode bias for the two radio-frequency tubes is partly fixed and partly variable. The fixed bias is derived from the voltage drop across R_2 and R_8. The variable bias value is provided by a voltage drop across R_{44} and variable resistor R_{30}. Any change in the setting of R_{30} will change the bias applied to the cathodes of these two tubes. R_{30} is shorted to ground for AVC operation so that the cathode biases are provided entirely by the drop across resistors R_2 and R_8. The cathode bias for the mixer tube is derived from the drop across R_{15} and is not variable. The injector grid bias for the mixer tube is secured by means of resistors R_{14} and R_{15}. Each cathode has its own cathode bypass capacitor C_8, C_{17} or C_{48}. Coils L_1, L_5 and L_6; and L_{13} and L_{14} are the inductances for the grid and plate circuits of the first radio-frequency, second radio-frequency, and mixer stages. These tank inductances are tuned by a ganged capacitor consisting of C_7, C_{16} and C_{46}. Trimmer capacitors C_2, C_{14}, and C_{27} are provided to permit individual alignment of the three circuits. In order to isolate each stage, decoupling resistors R_6 and R_{11} are located in the B+ lead of the first radio-frequency and second radio-frequency amplifier stages. These decoupling resistors are bypassed to ground by capacitors C_{76} and C_{81}. Also, all AVC circuits contain resistor-capacitor network filters for decoupling purposes.

18. Radio-Frequency Oscillator (figs. 6 and 7).—

a. Receivers BC-312-(*), BC-312-(*)X and BC-342-(*).

The radio-frequency oscillator in Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) employs a modified Hartley circuit. The tank circuit consists of an inductance L_{19}, which is tuned by one section of the ganged capacitor C_{82}. Fixed capacitor C_{40} is used in series with the tuning capacitor on the three highest frequency bands. Shorting switch SW_8 is ganged with the shorting switches already mentioned. Trimmer capacitor C_{19} is used to align the oscillator tank circuit so it will track with the other tuned radio-frequency stages in the receivers. The resistor R_{41} serves to reduce the plate voltage supplied by the power supply to the proper

[5]These two resistors are in parallel.

value. The oscillator plate is bypassed by C_{83} directly to ground which forms the plate return to the radio-frequency grounded end of the tank coil; C_{88} serves as a grid blocking capacitor and R_{42} as a grid bias resistor. The radio-frequency voltage occurring between the cathode of the oscillator tube and ground is impressed on the injector grid of the mixer tube (first detector) through the coupling capacitor C_{47}. The heterodyne action of the mixer and oscillator on the received signal produces an output signal (at 470 kc, the intermediate frequency) which has the same modulation as the signal received on the antenna.

b. Receivers BC-314-(*) and BC-344-(*).—

In Receivers BC-314-(*) and BC-344-(*) the radio-frequency oscillator is of the plate feed-back type. The tank circuit consists of transformer L_{21} and L_{22}, fixed capacitor C_{28}, and one section of ganged capacitor C_{67}. Trimmer capacitor C_{23} is used to align the oscillator tank circuit so it will track with the other tuned radio-frequency stages. Resistor R_{13} serves to reduce the plate voltage supplied by the power supply to the proper value. Capacitor C_{72} is used to bypass the oscillator plate return to ground; capacitor C_{66} serves as the grid blocking capacitor, and resistor R_{88} as the grid bias resistor. The radio-frequency voltage impressed on the injector grid of the mixer tube is secured from the oscillator tank circuit. The heterodyne action of the mixer and oscillator on the received signal produces an output signal (at 92.5 kc, the intermediate frequency) which has the same modulation as the signal received on the antenna.

19. Crystal Filter (fig. 10).—

A crystal filter is incorporated in Receivers BC-312 to BC-312-J, BC-312-HX and BC-342-(*). The output of the mixer stage is coupled to the grid circuit of the first intermediate-frequency stage through the first detector transformer L_{28}. Capacitor C_{53} and the primary coil of the intermediate-frequency transformer are wired in parallel to form a resonant circuit which is tuned to 470 kc by an iron core within the transformer coil. The secondary of this transformer and both coils in the first intermediate-frequency and second intermediate-frequency transformers, L_{29} and L_{30}, are tuned in a similar manner. In the secondary side of the first detector transformer L_{28}, there is a bridge circuit consisting of capacitors C_{94}, C_{95} and C_{51}, and a crystal CX which is

provided with a shorting switch SW_{10}. When this switch is closed, one-half of the available voltage across the secondary winding of the first detector transformer L_{28} is impressed on the grid of the

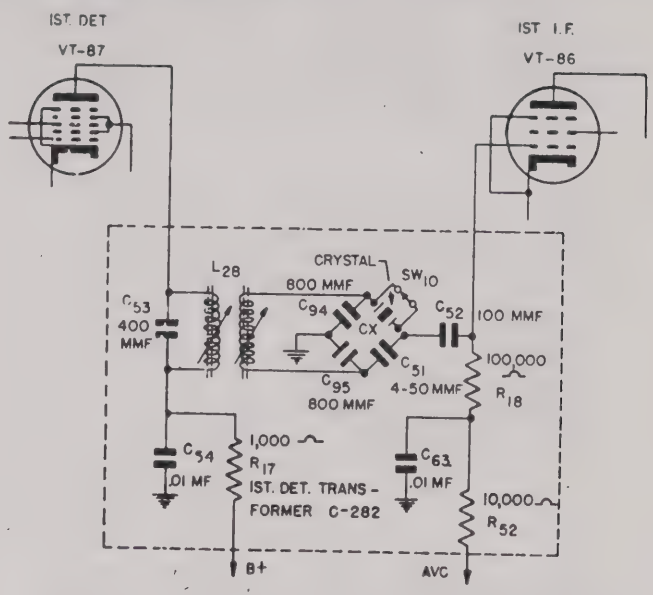


Figure 10.—Circuit diagram, crystal filter circuit.

first intermediate-frequency tube through a blocking capacitor C_{52}. When the switch is open (the CRYSTAL PHASING control turned away from OUT), the signal is impressed on the grid of the first intermediate-frequency tube through the crystal CX and blocking capacitor C_{52}. This crystal, which behaves as a sharply tuned resonant circuit, resonates at the intermediate-frequency of 470 kc. The crystal with its holder is one element of a bridge circuit also containing capacitors C_{94}, C_{95} and C_{51}. Capacitor C_{51}, which is operated by the CRYSTAL PHASING knob, makes it possible to adjust this bridge circuit so that the capacitance of the crystal CX is balanced out and undesired signals which are close to, and interfering with, the desired signal are discriminated against. The control is referred to as CRYSTAL PHASING, since its operation tunes the bridge circuit and consequently adjusts the phase relations of the voltages and currents. The sharpness of resonance of this crystal bridge greatly increases the effective selectivity of the receiver when the crystal is in the circuit.

20. Intermediate-frequency Amplifier (figs. 6 and 7).—

a. Receivers BC-312-(*), BC-312-(*)X and BC-342-(*).

In Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) resistor R_{52} provides a high impedance, d-c grid return for the first intermediate-frequency amplifier tube and provides for the introduction of AVC voltage. The intermediate-frequency stages are coupled to each other inductively by the first and second intermediate-frequency transformers, L_{29} and L_{30}. Both sides of these transformers form circuits which are made resonant to the intermediate-frequency by a capacitor in parallel with each winding. These transformers are tuned by a movable iron core. Cathode bias for the first intermediate-frequency amplifier tube is derived from the voltage drop across R_{19} and the same voltage divider system as for the first and second radio-frequency amplifier tubes. Cathode bias for the second intermediate-frequency amplifier tube is secured from the voltage drop across the resistor R_{24}. The screen voltages for the two intermediate-frequency amplifier tubes are provided by voltage dividers consisting of R_{20} and R_{21} for the first intermediate-frequency amplifier tube, and R_{25} and R_{26} for the second intermediate-frequency amplifier tube. These voltage dividers are connected between B+ and ground. Each screen is separately bypassed to ground by its own capacitor, either C_{60} or C_{66}.

b. Receivers BC-314-(*) and BC-344-(*).—

In Receivers BC-314-(*) and BC-344-(*) the first detector transformer is made resonant by means of the two capacitors, C_{34} and C_{32}, connected in parallel with coils L_{29} and L_{30} which in turn are tuned by movable iron cores. The AVC voltage is introduced through resistor R_{18} and bypassed by capacitor C_{33}. Cathode bias for the first intermediate-frequency amplifier tube is secured from the voltage drop across R_{19}, R_{30} and R_{44}. Capacitor C_{51} is the cathode bypass for this tube. The first intermediate-frequency transformer is an impedance coupling device made up of the tuned circuit L_{31} and C_{36} and the coupling capacitor C_{38}. Resistor R_1 provides a high-impedance, d-c grid return for the second intermediate-frequency amplifier tube. Cathode bias is secured by the drop across resistor R_{24} which is bypassed by capacitor C_{54}. The screen and plate circuits of the intermediate-frequency amplifier tubes are filtered by decoupling resistor-capacitor networks made up of R_{21}, R_{22}, R_{26}, R_{27}, C_{52}, C_{37}, C_{55} and C_{42}. AVC is introduced into the second intermediate-frequency amplifier tube through resistors R_1 and R_{23}

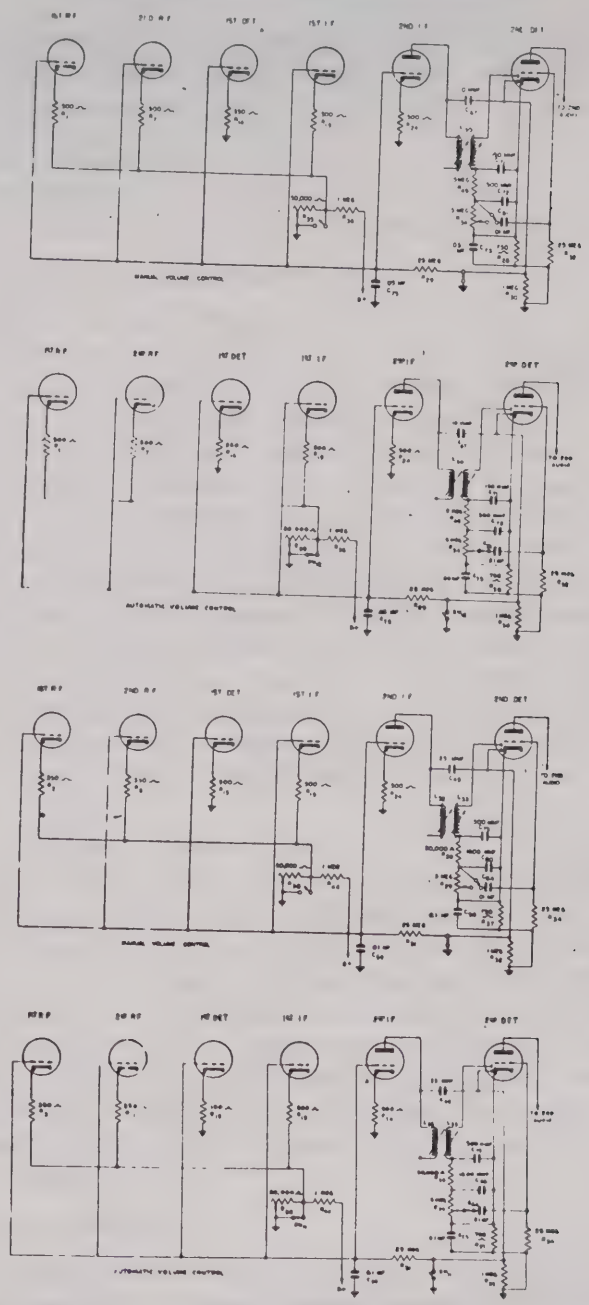


Figure 11.—Functional diagram, second detector, manual and automatic volume control, all models.

bypassed by capacitor C_{30}. The second intermediate-frequency transformer is made up of coils L_{32} and L_{33} and capacitors C_{40} and C_{41}.

21. Second Detector and Audio Amplifier (figs. 6, 7, and 11).—

A duplex-diode triode is used as a second-detector-AVC-1st audio amplifier tube. One diode section serves as the second detector. The other diode section provides AVC voltage. The triode portion of the tube serves as the first audio-frequency amplifier. In Receivers BC-312-(*), BC-312-(*)X and BC-342-(*), resistors R_{49} and R_{34} comprise the diode load resistance. In Radio Receivers BC-314-(*) and BC-344-(*), the load resistors are R_{28} and R_{29}. Radio-frequency bypass capacitors C_{71} annd C_{72} in the high-frequency receivers and C_{75} and C_{80} in the medium-frequency receivers are used to filter any remaining radio frequency out of the detector diode load circuit. Bias for the second detector, AVC, first audio amplifier tube is secured by resistor R_{28} and bypassed by capacitor C_{73} in the high-frequency receivers and by R_{37} and C_{58} in the medium-frequency receivers. The grid of the first audio-frequency amplifier tube receives its excitation through coupling capacitor C_{81} for the high-frequency group and C_{64} in the medium-frequency group of radio receivers in series with the MVC-AVC switch arm. This excitation consists of the voltage drop across the entire resistance of R_{34} (h-f group) or R_{29} (m-f group) for MVC operation, and the drop across a section of the same resistance for AVC operation. The output of the first audio-frequency amplifier tube is coupled by C_{76} (h-f group) or C_{43} (m-f group) to the second audio-frequency amplifier tube grid. The primary of transformer T_1 in the first audio-frequency amplifier tube plate circuit acts as an impedance coupling element. The B+ is bypassed to ground by capacitor C_{74} (h-f group) or C_{57} (m-f group) to keep radio frequency out of the plate power supply. Cathode bias for the second audio-frequency amplifier tube is provided by the drop across the parallel-connected resistors R_{31} and R_{54} in the high-frequency group and R_{33} and R_{52} in the medium-frequency group. The resistors are bypassed by C_{98} (h-f group) or C_{90} (m-f group). The output of the first audio-frequency amplifier tube is coupled through transformer T_1 to jack J_1, and the output of the second audio-frequency amplifier tube is coupled through transformer T_2 to jacks J_2 and J_3 which are connected in

parallel in receivers BC-312 through BC-312-J, excepting BC-312-HX, BC-342 through BC-342-J, BC-314 to BC-314-D and BC-344. In receivers BC-312-(*)X, BC-312-L, BC-312-N, BC-342-L, BC-342-N, BC-314-E, BC-314-G and BC-344-D, the output of the second audio-frequency amplifier tube is coupled through transformer T_2 to jacks J_1, J_2 and J_3, which are connected in parallel. Headset or a speaker may be plugged into these jacks.

22. Continuous-wave Oscillator.—

a. High-frequency Group (fig. 6).—

A modified Hartley oscillator circuit is used. The tank circuit of this oscillator consists of coil L_{31} and capacitors C_{84} and C_{85} connected in parallel. A grid blocking capacitor C_{86} is used in conjunction with a grid bias resistor R_{43}. The plate supply to this oscillator tube is connected through voltage-dropping resistor R_{37}. Switch SW_{11} in the plate supply lead permits turning the continuous-wave oscillator on or off at will. The radio-frequency plate circuit is completed through capacitor C_{87} from plate to ground. A portion of the voltage drop across tank coil L_{31} is impressed on the plate end of the second detector tank circuit through a low-pass filter consisting of coil L_{32}, resistor R_{51}, and capacitors C_{96} and C_{97}; and through the coupling capacitor C_{41}. The purpose of this filter is to prevent the introduction of harmonics of the continuous-wave oscillator frequency into the detector circuit of the receiver.

b. Low-frequency Group (fig. 7).—

A modified Hartley oscillator circuit is used in these radio receivers. The tank circuit of the oscillator consists of coil L_{34} and capacitors C_{82}, C_{68}, and C_{69} connected in parallel. Capacitor C_{74} is the grid-blocking capacitor and resistor R_{39} is the grid bias resistor. Resistor R_{36} is the plate voltage-dropping resistor connected in series with switch SW_{10}, which permits switching the continuous-wave oscillator on or off. Capacitor C_{65} completes the radio-frequency circuit from plate to ground. The radio-frequency voltage appearing across coil L_{34} is injected into the second detector tube through capacitor C_{44}.

23. Volume Control.—

a. Manual Volume Control Action (figs. 6, 7 and 11).—

When operating on manual volume control (MVC), the cathodes of the first and second radio-frequency amplifier tubes and

the first intermediate-frequency amplifier tube are returned to the voltage divider consisting of resistors R_{35} and R_{36} in the high-frequency group and resistors R_{30} and R_{44} in the medium-frequency group. This voltage divider is connected between B+ and ground so that, by operating the VOL control on the front panel, the grid bias on these tubes is changed, thus varying the amplification of the tubes. In this mode of operation, the AVC bus is shorted to ground, and that portion of the audio-frequency signal which appears across R_{34} (h-f group) and R_{29} (m-f group) is available at the input of the first audio-frequency amplifier tube.

b. Automatic Volume Control Action (figs. 6, 7 and 11).—

In AVC operation, the control grids of the first and second radio-frequency amplifier tubes, the mixer tube, and the first and second intermediate-frequency amplifier tubes are returned to ground through the AVC diode resistor R_{30} (h-f group) and resistor R_{32} (m-f group). A change in voltage across this load resistor affects the bias, thus changing the amplification of these tubes. The AVC system is designed to bias these tubes more negatively as the signal increases, thus reducing their amplification and tending to maintain a constant input to the second detector. The AVC diode plate of the second detector tube is coupled through C_{67} (h-f group) or C_{45} (m-f group) to the plate circuit of the second intermediate-frequency stage, providing an intermediate-frequency voltage which is rectified by the AVC diode circuit. Rectification takes place in the AVC diode circuit when the peak value of the intermediate-frequency voltage impressed is greater than the d-c voltage drop across the second detector bias resistor in the cathode circuit of this tube. The magnitude of the AVC voltage is therefore dependent upon the strength of the received signal in excess of the voltage drop across the bias resistor.

24. Dial Lamp Circuit (figs. 12, 13, 14, 15 and 16).—

In Receivers BC-312-(*), BC-314-(*), BC-342-(*) and BC-344-(*) two dial Lamps LM-27 are connected in series. In Receivers BC-312-(*) and BC-314-(*) the source of power is the 12-volt, d-c supply; and in Radio Receivers BC-342-(*) and BC-344-(*) it is supplied by a separate 12-volt, a-c winding of power transformer T_3. In Receiver BC-312-(*)X, two lamps LM-42 are connected in series across the 24-volt, d-c supply. A dial light dimmer-rheostat R_{56} (R_{55} on BC-312-L and BC-312-

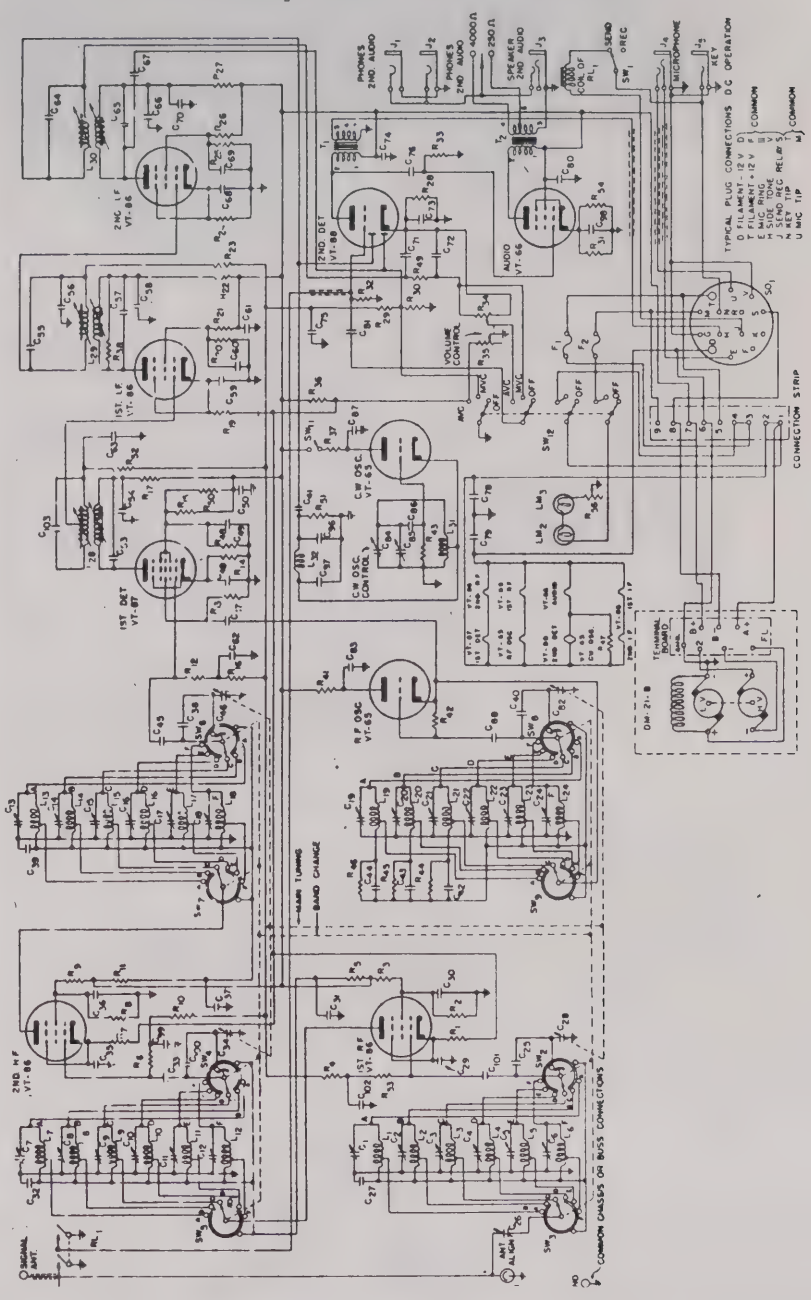


Figure 12.—Schematic diagram, Receiver BC-312-(*).

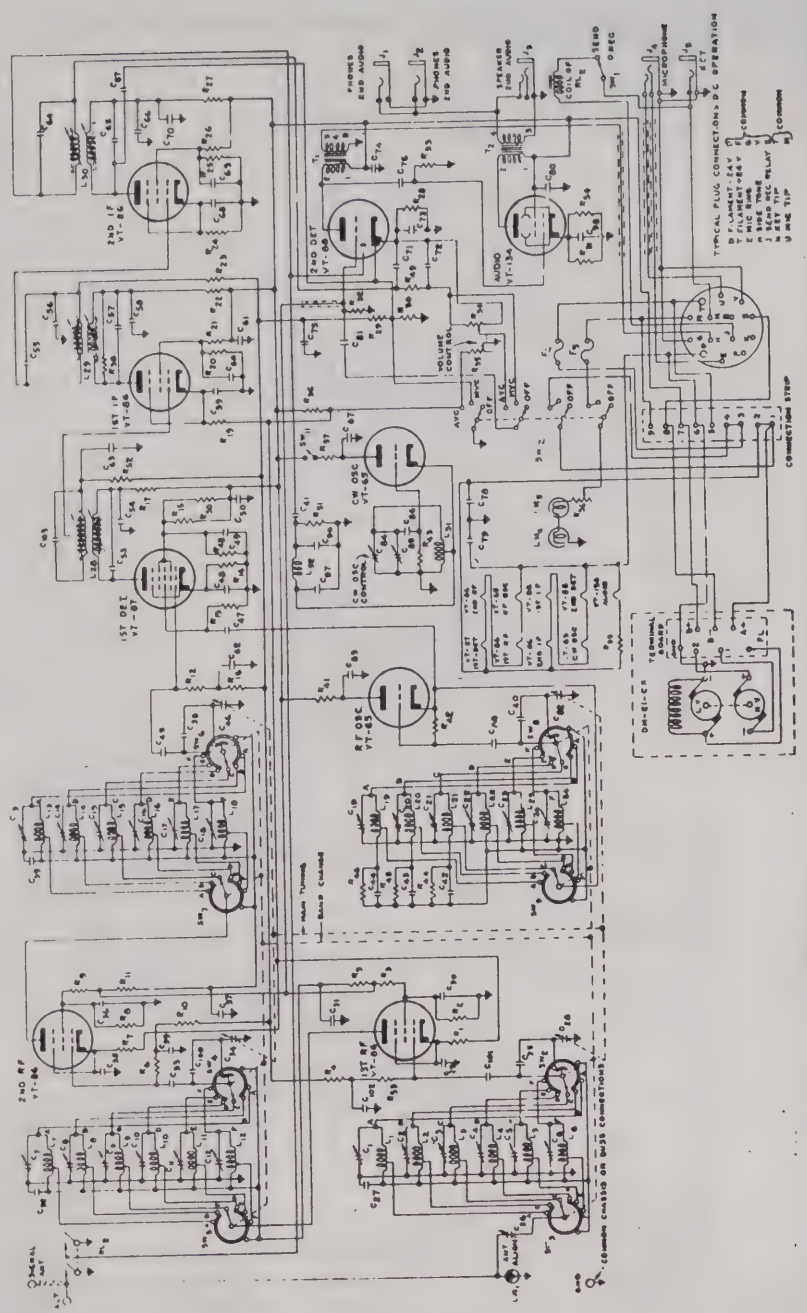


Figure 13.—Schematic diagram, Receiver BC-312-NX. Receiver BC-312-HX incorporates crystal filter, see figure 10.

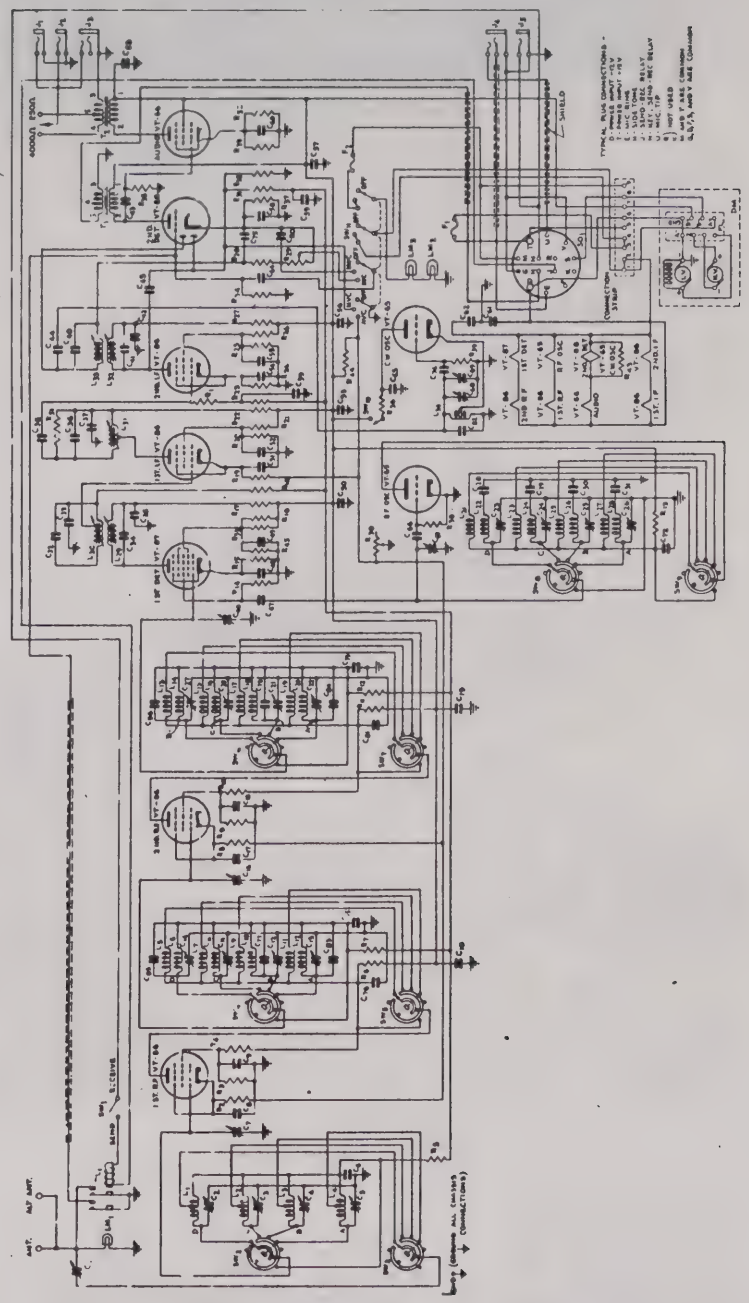


Figure 14.—Schematic diagram, Receiver BC-314-(*).

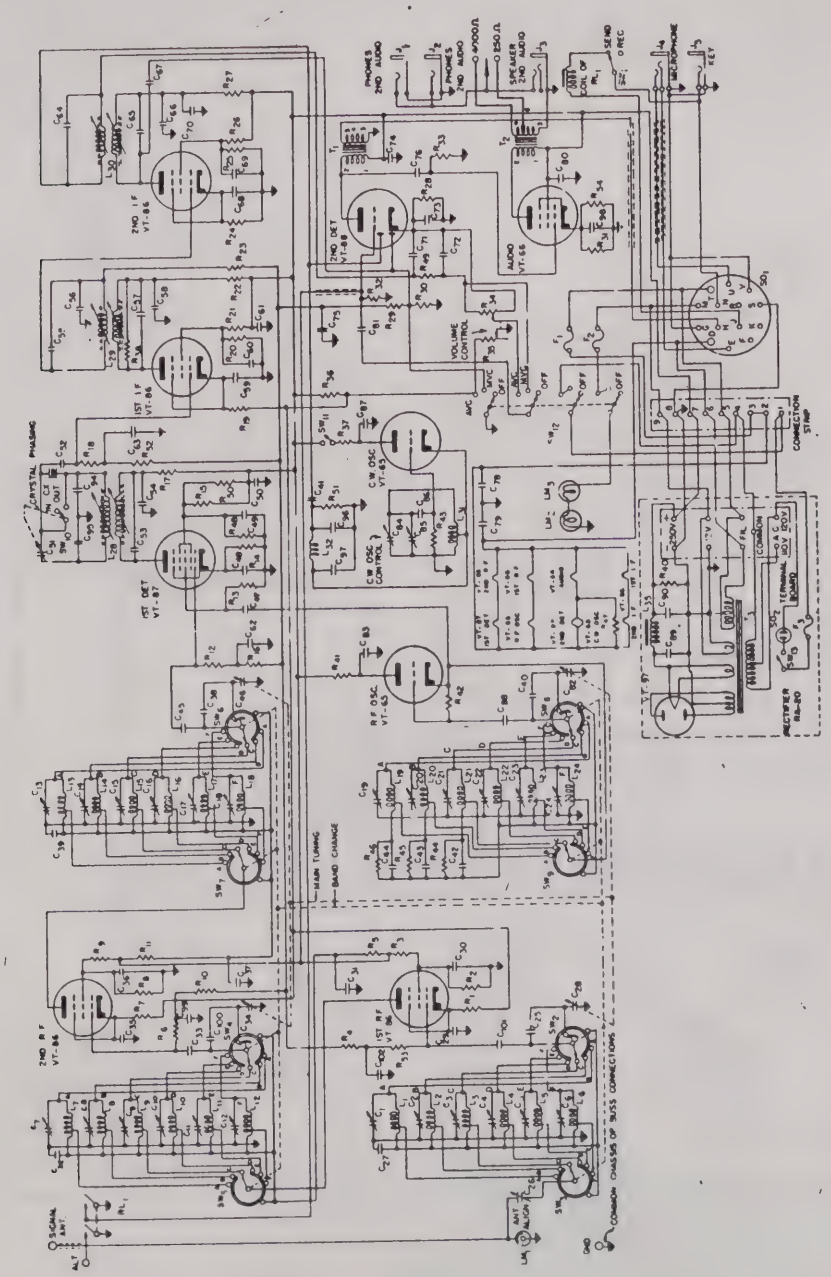


Figure 15.—Schematic diagram, Receiver BC-342-(*).

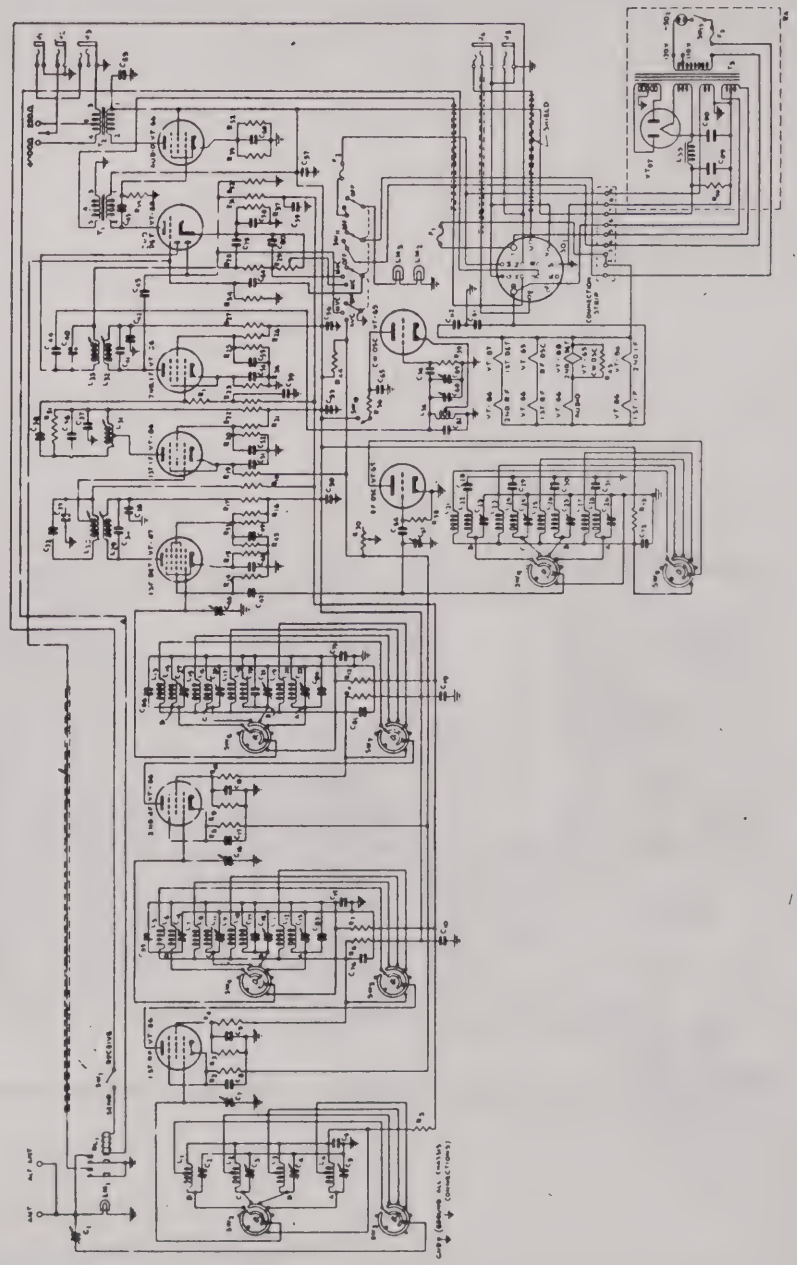


Figure 16.—Schematic diagram, Receiver BC-344-(*).

RADIO RECEIVERS BC-312-(*), BC-312-(*)X, BC-342-(*), BC-314-(*) AND BC-344-(*)

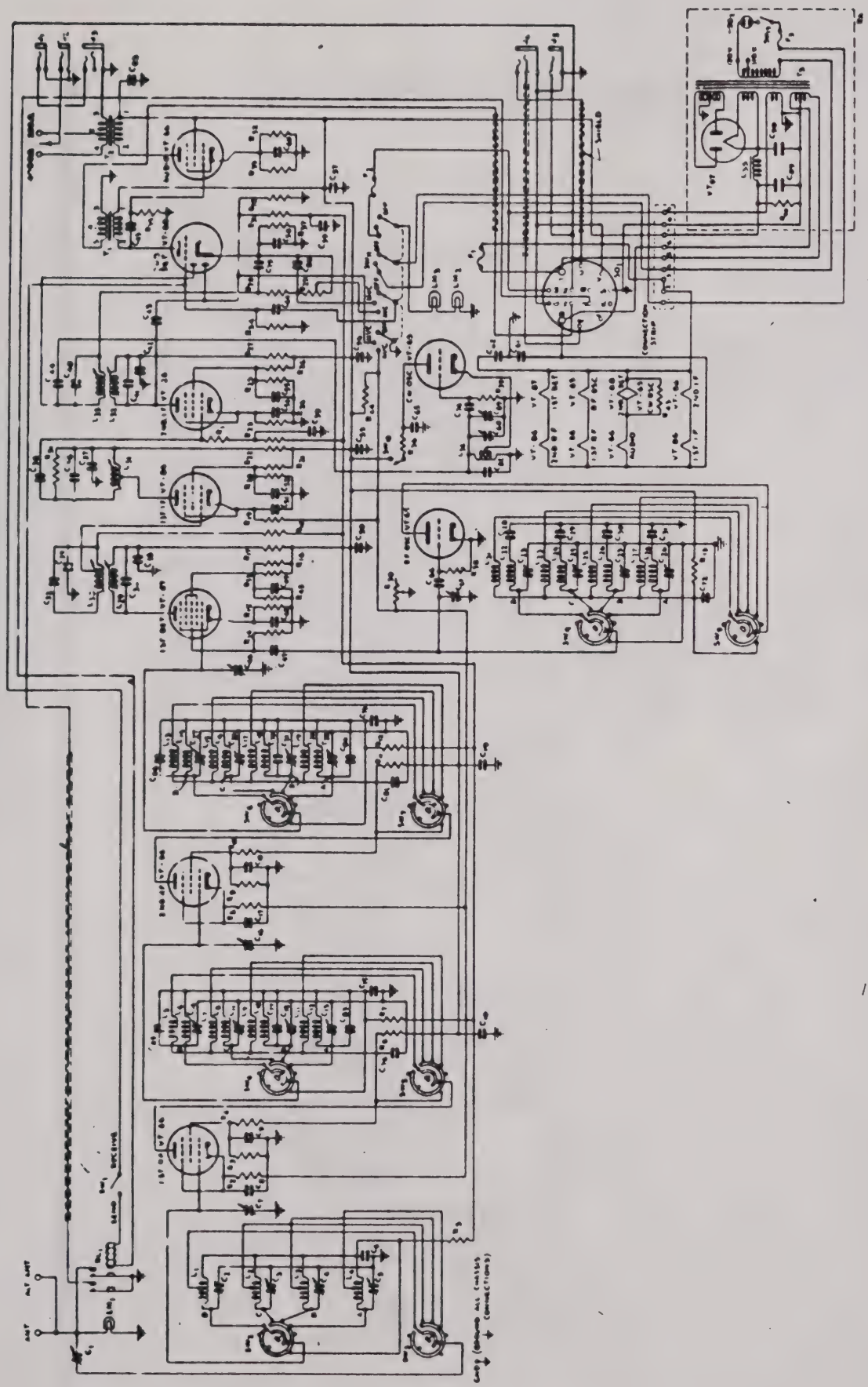
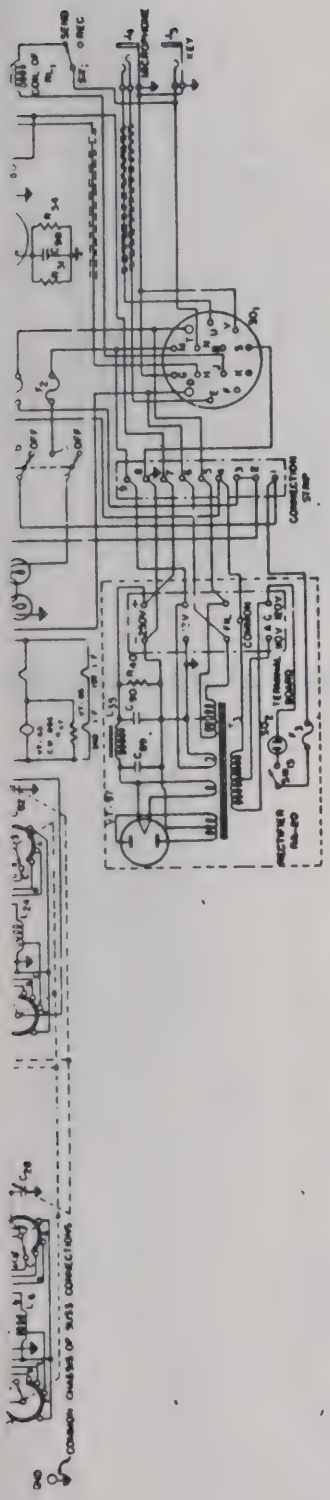


Figure 16.—Schematic diagram, Receiver BC-344-(*).

RADIO RECEIVERS BC-312-(*), BC-312-(*)X, BC-342-(*), BC-314-(*) AND BC-344-(*)



er BC-342-(*).

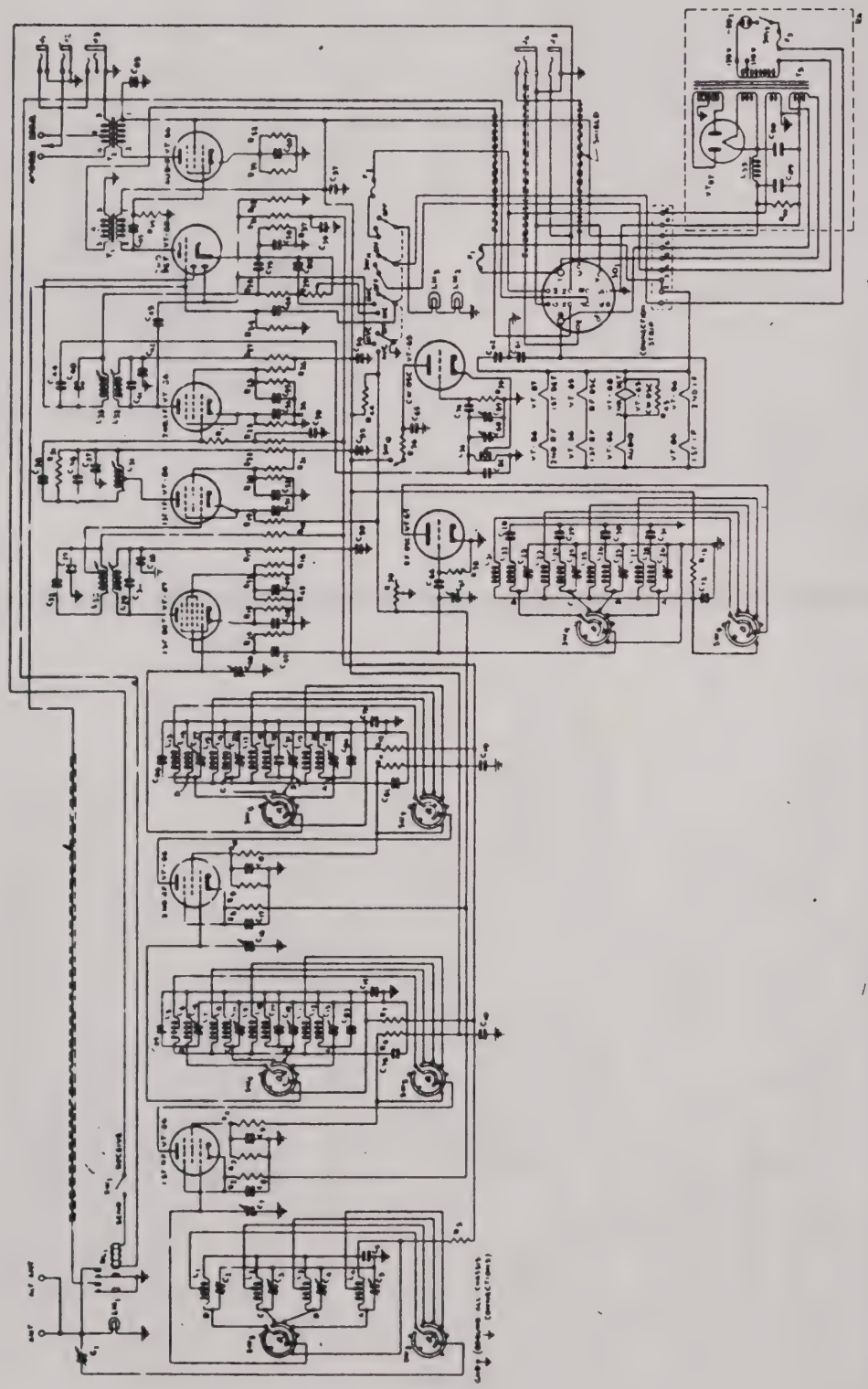


Figure 16.—Schematic diagram, Receiver BC-344-(*).

M) is incorporated in Receivers BC-312-N and BC-312-NX. The dial lamps are connected so as to receive current through fuse F_2 or F_5 (F_5 on BC-312-(*)X only) and are turned on or off by the OFF-MVC-AVC switch in all models.

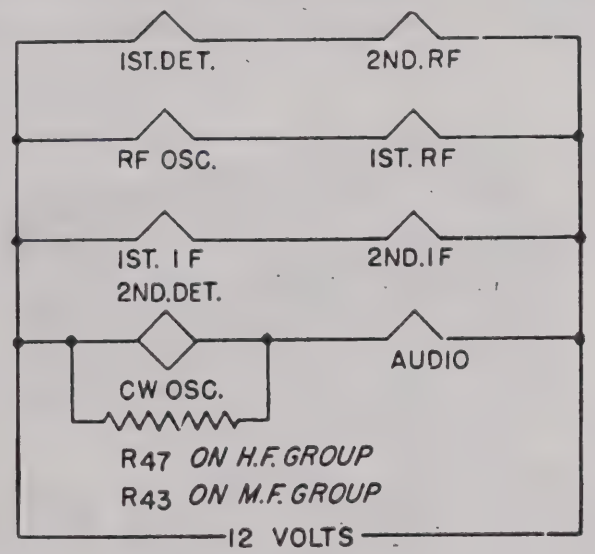


Figure 17.—Tube heater circuits in BC-312-(*), BC-314-(*), BC-342-(*) and BC-344-(*).

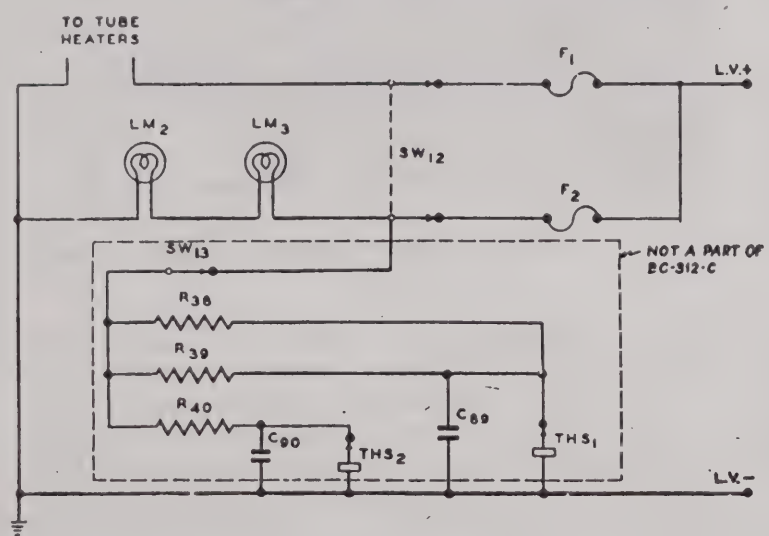


Figure 18.—Oscillator compartment heaters in BC-312, and BC-342.

25. Heater Circuits (figs. 17, 18 and 19).—

Either metal or GT type tubes are employed in these receivers. All tubes except Tube VT-134 in Receiver BC-312-(*)X and Tube VT-97 in Receivers BC-342-(*) and BC-344-(*) require a heater voltage of approximately 6 volts per tube. Tube VT-134 requires 12.6 volts and Tube VT-97 requires 5 volts. To permit operation from a 12 or 24 volt power supply system, the tubes

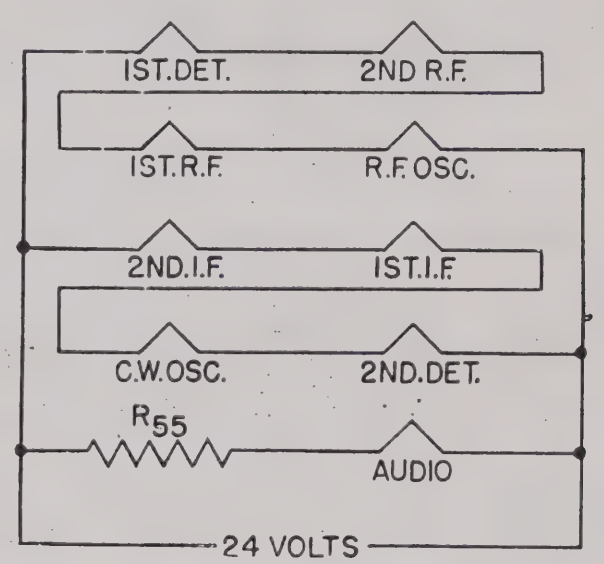


Figure 19.—Tube heater circuits in BC-312-(*)X.

in the receiver proper are connected in series-parallel (fig. 17). In Radio Receiver BC-312-(*)X (fig. 19) resistor R_{55} is used as a filament-dropping resistor, in series with the heater of Tube VT-134. In Radio Receivers BC-312-(*), BC-314-(*), BC-342-(*), and BC-344-(*) (fig. 17) a resistor is connected in parallel with Tubes VT-88 and VT-65 to reduce the current flowing through the heater of these tubes to the correct value. Tube VT-97 is used in Rectifier RA-20, and its filament power is supplied by a separate winding on power transformer T_3. Tube heaters in the receivers are bypassed to ground through capacitors. In Receivers BC-312 and BC-342 the temperature of the oscillator compartment is thermostatically controlled by means of heaters (fig. 18).

26. Dynamotor DM-21-(*) (figs. 20 and 21).—

Dynamotor DM-21-(*) as used in Receivers BC-312-(*) and BC-314-(*) (DM-17-A* in BC-312) operates on a d-c input of between 12 and 14 volts, producing the necessary plate voltage for the receivers. This dynamotor is secured to the underside of the

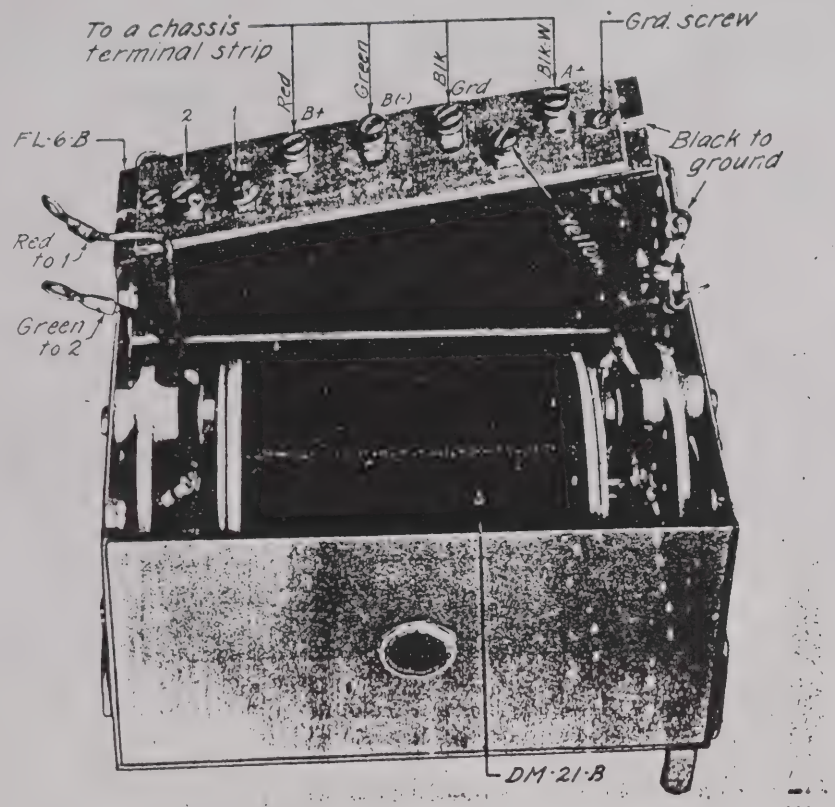


Figure 20.—Dynamotor DM-21-(*) as used in BC-312-(*) and BC-314-(*).

chassis of the receiver. Under full load conditions, the dynamotor draws about 2.7 amperes at 14 volts direct current with a d-c output of approximately 85 milliamperes at 230 volts. Filter FL-6-B is inclosed within the dynamotor to prevent the transfer of radio-frequency interference and commutator ripple into the voltage supply circuits of the receiver.

*DM-17-A is interchangeable with DM-21-(*).

27. Dynamotor DM-21-CX (figs. 20 and 21).—

Dynamotor DM-21-CX is used in Receiver BC-312-(*)X and operates on a d-c input of between 24 and 28 volts, producing the

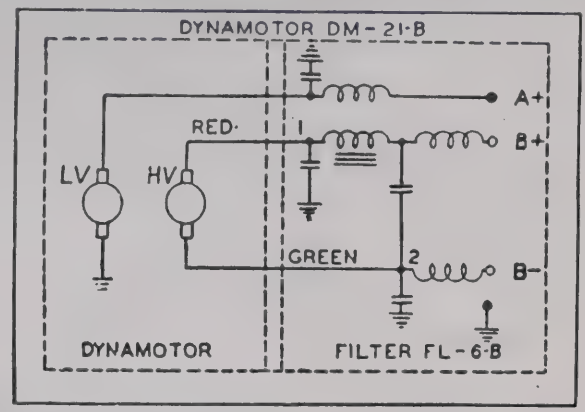


Figure 21.—Dynamotor DM-21-(*), schematic diagram.

necessary plate voltage for the receiver. This unit is identical in appearance to DM-21-(*) (figs. 20 and 21). This dynamotor is secured to the underside of the chassis of the receiver in the same way as Dynamotor DM-21-(*). Under full load conditions, the dynamotor draws about 1.6 amperes at 28 volts direct current with a d-c output of approximately 82 milliamperes at 245 volts. Filter FL-6-CX is inclosed in the dynamotor case and prevents the transfer of radio-frequency interference and commutator ripple.

28. Rectifier RA-20 (figs. 22 and 23).—

Rectifier RA-20 is used in Receivers BC-342-(*) and BC-344-(*). Operating on an a-c input of 110-120 volts, 50-60 cycles, it supplies the necessary plate voltage for the receivers. This rectifier is secured to the underside of the chassis in the same manner as the dynamotor in battery-powered receivers. Under full load conditions, the rectifier draws approximately 0.7 ampere at 120 volts alternating current with a d-c output of approximately 95 milliamperes at 260 volts. The power transformer used in this rectifier has one primary winding and four secondary windings. The primary winding is tapped to provide for an input of 110-120 volts, 50-60 cycles. The high-voltage secondary winding delivers approximately 300 volts alternating current to each side of the center

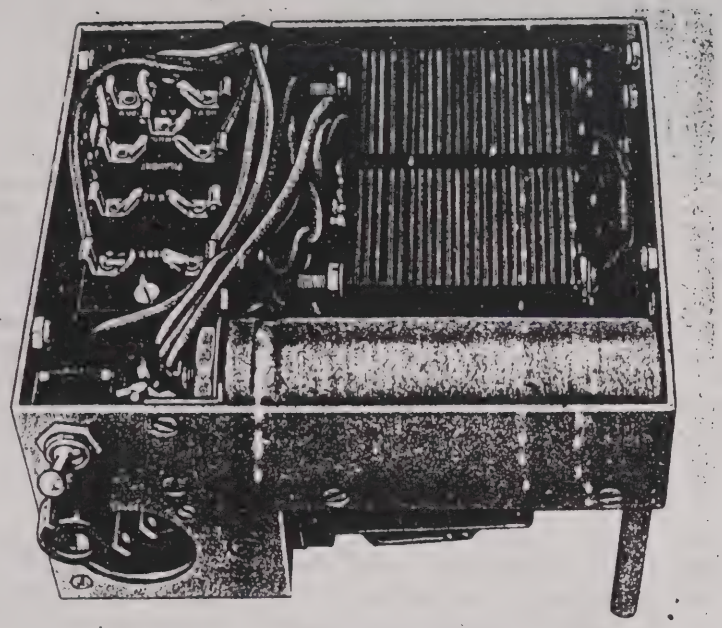
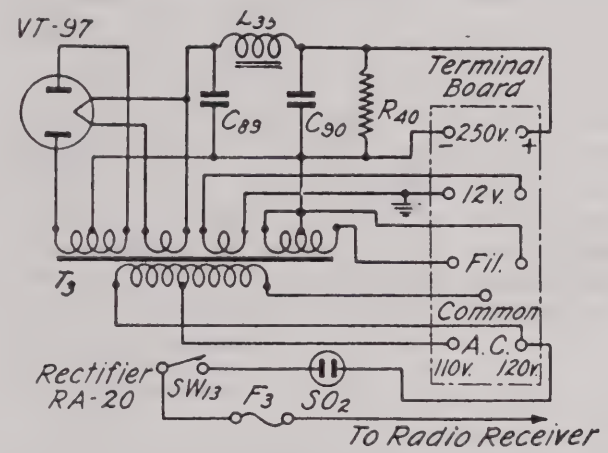


Figure 22.—Rectifier RA-20, inside view, as used in BC-342-(*) and BC-344-(*).



C_{89}, C_{90} — 8-microfarad Capacitor CA-329
F_3 — 2-ampere Fuse FU-27.
L_{35} — 14-henry choke Coil C-227.
R_{40} — 65,000-ohm bleeder Resistor RS-220.
SO_2 — A-c power socket.
SW_{13} — Line Switch SW-105.
T_3 — Power Transformer C-228.

Figure 23.—Rectifier RA-20, schematic diagram.

tap, under load. The rectifier filament winding delivers 2 amperes at 5 volts for Tube VT-97; the receiver tube filament winding delivers 2 amperes at 12 volts; and the auxiliary filament winding, which supplies voltage to the pilot Lamps LM-27, delivers .3 amperes at 12 volts. The rectifier Tube VT-97 is of the high-vacuum, full-wave metal type. A filter is provided in the rectifier supply which is made up of two 8-microfarad electrolytic capacitors and 14.5-henry, 85-milliampere choke coil. A bleeder resistor R_{40} is connected directly across the output of the rectifier filter to protect the filter capacitors. A 2-ampere fuse is placed in series with the primary of the transformer T_3 for overload protection.

SECTION IV
MAINTENANCE

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29. Lubrication.—

a. General.—

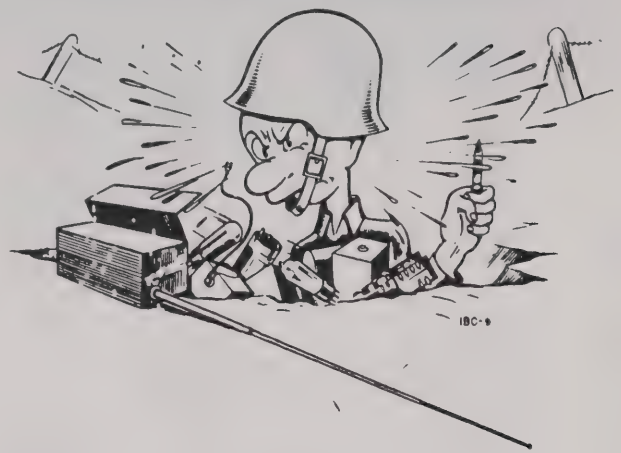
The various gears and bearings of the receiver chassis are lubricated by the manufacturer with sufficient lubricant to last the life of the equipment. Unless operated under abnormal conditions, they should never require further lubrication. In the event that such lubrication becomes necessary, petrolatum should be used very *sparingly*.

b. Dynamotors DM-17-A, DM-21-(*) and DM-21-CX.—

The bearings of these dynamotors are of the sealed, ball-bearing type, and are packed with grease at the time of manufacture. They will require one drop of light lubricating oil at each bearing after 500 hours of operation. Any oil above this amount will do more harm than good. To remove the cover of the dynamotor compartment, loosen the two knurled thumb screws on the left-hand side (facing the rear of set) and the flat-head screws on the right-hand side of the dynamotor.

30. Inspection.—

The receiver should be given a thorough examination before each use and before being returned to storage. A careful inspection should be carried out to make sure that the equipment is left in good operating condition and thus ready for use at any time. This inspection should include examination of the power cord to see that the plug is securely fastened, and that it has not been damaged. All accessible components should be examined and, if dirty, should be cleaned.



31. Tube Socket Voltage Measurements.—

a. Figures 24, 25 and 27 show tube socket voltage measurements for high-frequency units, and figures 26 and 28 those for medium-frequency units, made with Test Set I-56- series. These voltages are not critical, and considerable variation may be expected from receiver to receiver. However, if voltages vary greatly from those indicated, further tests should be made to locate the cause and remedy it. The input voltage to the 12 to 14 volt units should be adjusted to 14 volts; in the 24 to 28 volt units to 28 volts; and in receivers using 110 to 120 volt, 50 to 60 cycle alternating current, to either 110 or 120 volts, depending on the adjustment described in paragraph 10c. Socket voltages will vary depending on actual input voltages

32. Procedure In Case Of Failure.—

a. Failure of these receivers to operate properly may be due to external causes, such as a disconnected or grounded antenna, failure of the power source, or a damaged headset. Check all these possibilities before removing the receiver chassis from the cabinet. The receiver itself may now be checked by setting all controls for maximum sensitivity and noting the noise level. Lack of normal noise output, or no response when the antenna terminal is touched with a metallic object, indicates trouble within the receiver. The trouble, if actually within the receiver, will most frequently be a blown-out fuse, a loose or defective tube, or a defective power unit.

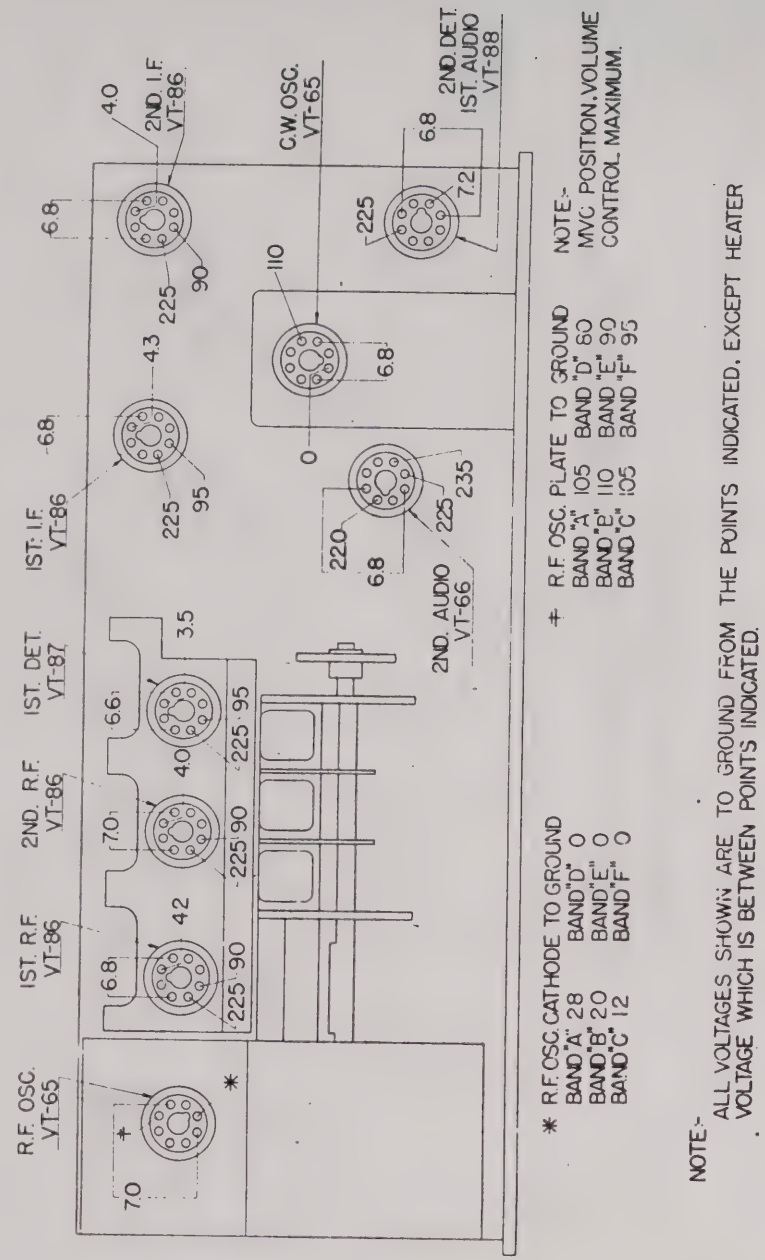


Figure 24.—Tube socket voltage measurements for BC-312-(*) using adapter with Test Set I-56- series.

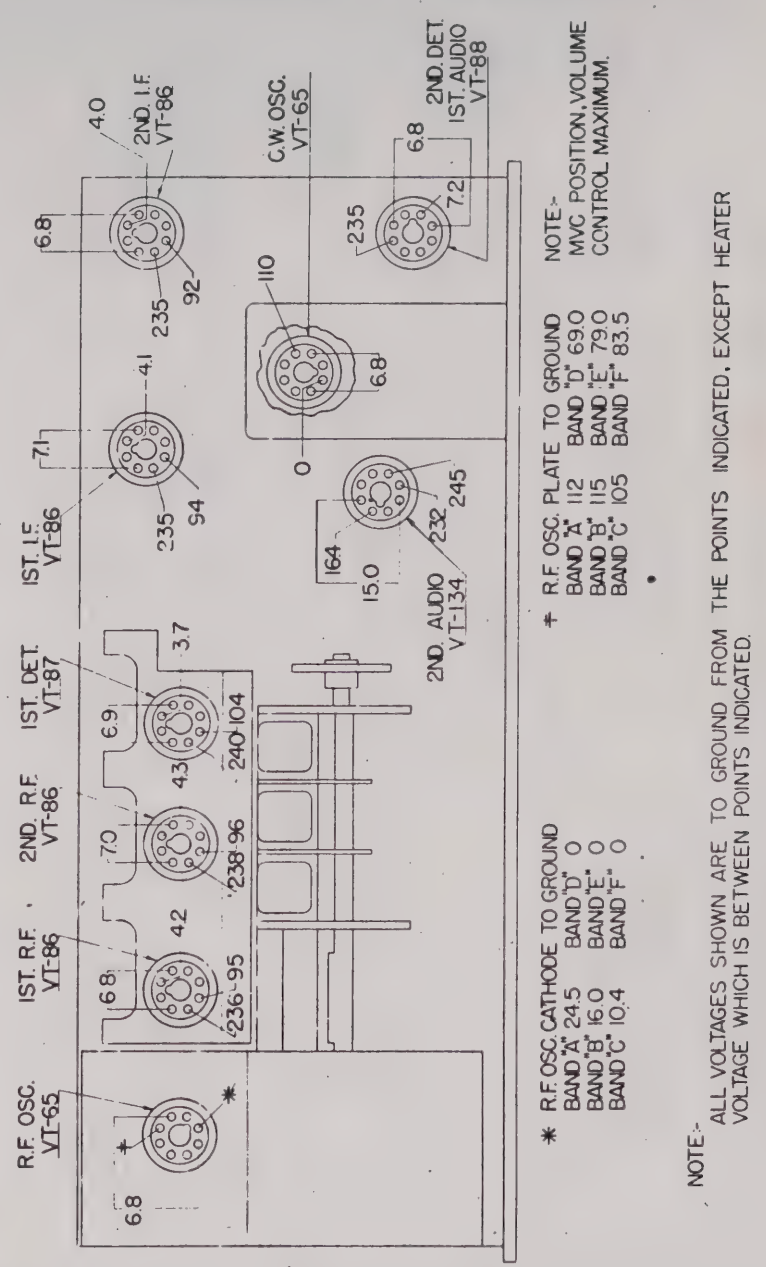


Figure 25.—Tube socket voltage measurements for BC-312-(*)X using adapter with Test Set I-56- series.

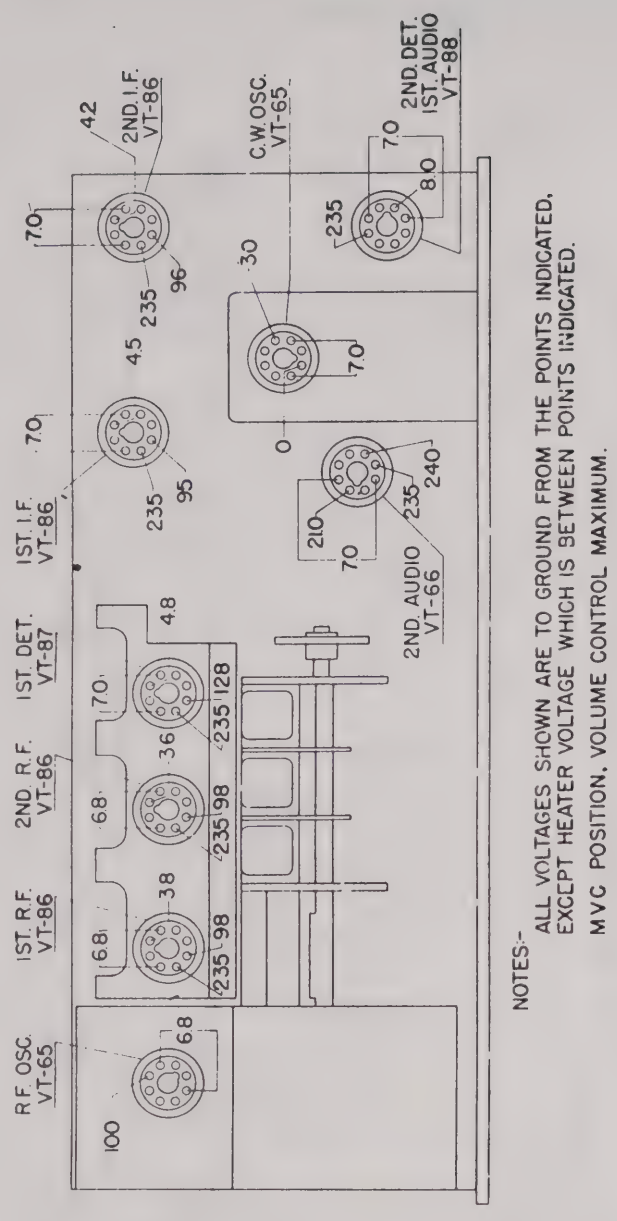


Figure 26.—Tube socket voltage measurements for BC-314-(*) using adapter with Test Set I-56- series.

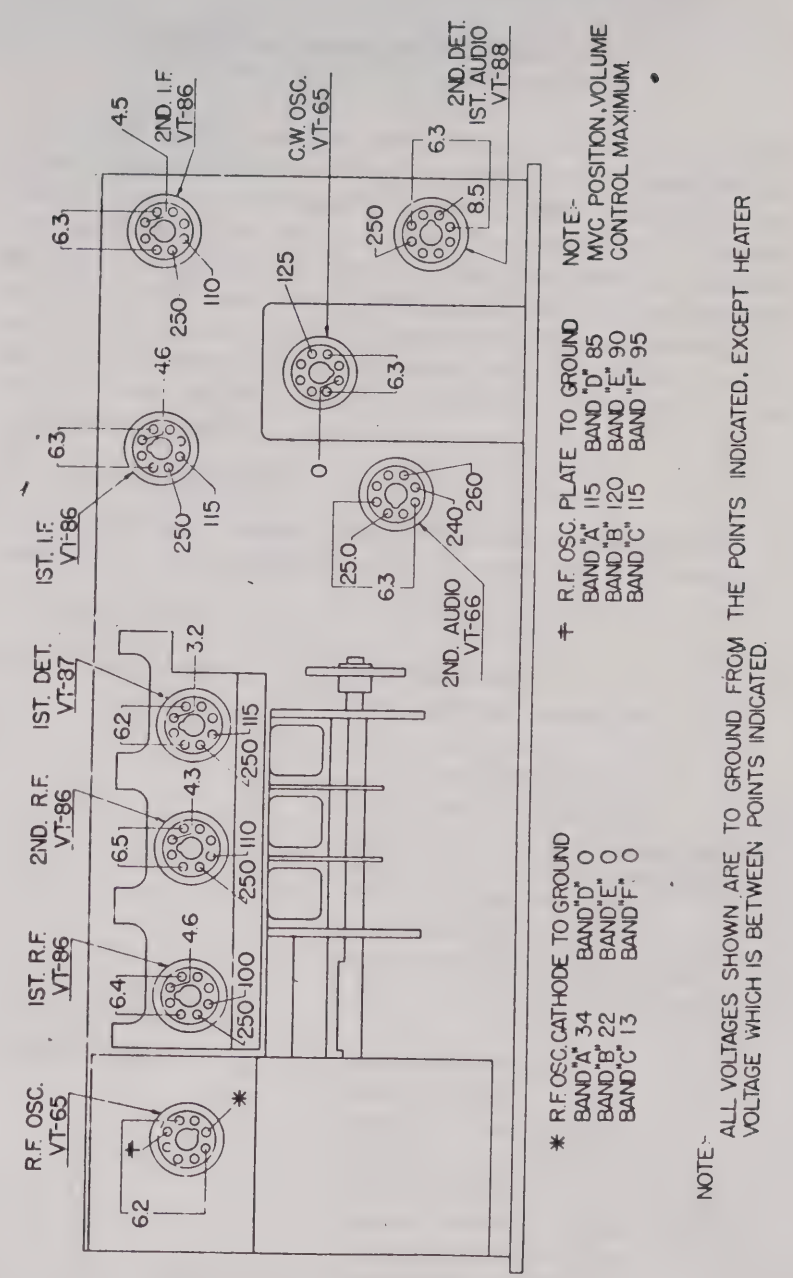


Figure 27.—Tube socket voltage measurements for BC-342-(*) using adapter with Test Set I-56- series.

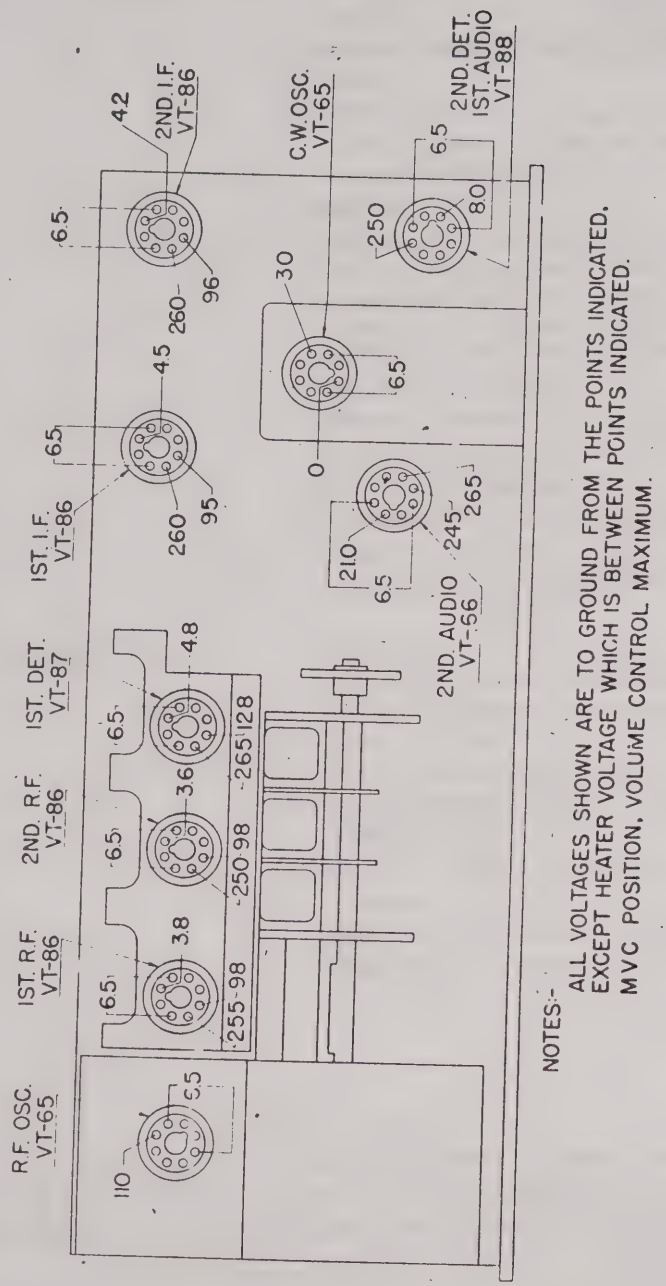


Figure 28.—Tube socket voltage measurements for BC-344-(*) using

b. One of the most frequent causes of trouble or poor results in the receivers is a partly charged storage battery. Check terminal voltage, level of the electrolyte and its specific gravity. Clean terminals and see that they are tight. Cleanliness of the case should be checked at least daily. (For technical data on storage batteries, see TM 10-580 and TM 11-430.) In vehicular installations, in addition to the above servicing, inspect the charging generator and see that it delivers current to the battery when the engine is slightly raced. Reversed polarity of battery connecting wires is another common cause of trouble.

33. Locating Trouble.—

The following possible causes of trouble are suggested in the event that detailed examination of the receiver becomes necessary:

SYMPTOM	CAUSE
No filament voltage.	Open power lead Short-circuited power lead Poor plug contact Burned-out fuse in panel Burned-out fuse in rectifier NOTE:— The first five causes should be checked before the receiver chassis is removed from the cabinet. Burned-out tube filament Damaged by-pass capacitor C_{78} or C_{79} Loose connection inside the receiver
No plate voltage.	Open or shorted cord Poor plug contact Burned-out fuse in panel Burned-out fuse in rectifier NOTE:— The first four causes should be checked before the receiver chassis is removed from the cabinet. Defective filter (FL-6-(*)) Loose connection inside receiver Shorted by-pass capacitor C_{50}, C_{61}, C_{74}, or C_{80}. Open resistor

SYMPTOM	CAUSE
No audio-frequency output.	Headset plug not completely inserted in jack
	Defective headset, headset plug, or cord
	NOTE:— The first two causes should be checked before the receiver chassis is removed from the cabinet.
	Defective tube
	NOTE:— Test the tubes with a tube checker of Test Set I-56-series. If found serviceable, they should be replaced in the sockets of the receiver from which they were removed.
	Loose connection inside receiver
	Damaged capacitor C_{81}
	Defective transformer (T_1 or T_2)
	Defective jack insulation
	Breakdown on radio-frequency coils, leads, or switches
	Defective band-change switch
Erratic noise in receiver.	Defective headset or headset cord
	NOTE:— This cause should be checked before the receiver chassis is removed from the cabinet.
	Dust or dirt in the receiver
	Loose connection in the receiver
	Chattering relay
	Defective capacitor or resistor in the receiver
	Defective dynamotor or filter unit
	Noisy volume control (R_{34} and R_{35})

34. Trouble Shooting.—

a. General.—

The simple tests described above will reveal the cause of the trouble in most cases of inoperative receivers. In cases where they do not, it is necessary to adopt a definite procedure. A competent repair man can readily find the "dead" stage by starting at the

output end of the receiver and working progressively back toward the antenna. A Signal Generator I-72-(*), or equivalent, is used as the signal source during the tracing process.

b. Checking Audio Amplifier.—

After the receiver and the signal generator have warmed up, turn the output switch of the latter so that a 400-cycle output from the modulator section becomes available at the output cord. Ground the shielded side of the cord directly to the chassis of the receiver. Plug phones into 2nd audio phone jack. Connect the "hot" end, by means of the test clip, to the triode plate of the second-detector tube, and listen in the headphones. If a good signal is heard, the final or second audio stage is operating satisfactorily. To check the operation of the triode audio-amplifier or first audio section of VT-88, clip the generator output to the center lug of the outer volume-control potentiometer, with the receiver set for automatic volume control, and turn volume control on full. The signal should be louder than before.

c. Checking Second Detector.—

Adjust the signal generator to give 470-kc[7], 400-cycle modulated output. Connect the "hot" end to the signal diode plate of VT-88 (pin No. 4). If the diode detector is operating, the 400-cycle tone will be heard in the phones.

d. Checking Intermediate-frequency Amplifier.—

Adjust the signal generator for a modulated 470-kc[7] output Turn the receiver to manual volume control. Connect a 300-ohm resistor in the "hot" output lead of the generator to act as a dummy antenna. Remove the grid clip of the second intermediate-frequency tube and fasten the dummy antenna to the tube grid cap. If the second intermediate-frequency stage is working, the tone will again be heard in the headset. Use the minimum output from the generator that gives a comfortable signal. Work back to the grid of the first intermediate frequency tube, and then to the first detector. When testing the latter, turn the CRYSTAL PHASING knob (if the set has a crystal filter) to OUT. Reduce the output of the generator as more stages come into action. Each time the generator output is connected to an intermediate-frequency grid, rock the frequency dial of the generator very slightly and note if the

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volume of the signal goes up. If maximum volume is obtained at frequencies above or below 470 kc[7], the adjusting screws of the intermediate-frequency transformers probably have been moved. *Do not undertake realignment.* This will be done after it has been definitely determined that the circuit components themselves are in good order.

e. Checking Radio-frequency Oscillator.—

(1) Check the plate voltage against the values shown in figures 24, 25, 26, 27 or 28. This oscillator is dependable and rarely gives trouble. However, to be absolutely sure of the check, remove the first detector tube from its socket and twist a bare end of an insulated wire, 2 to 3 feet long, around the injector grid pin of the tube. Be careful not to short the bare end to another pin. This is pin No. 5 counting clockwise from the key of the locating pin when looking at the bottom of the tube. Reinsert the tube in its socket, leaving off the grid cap, and place the wire on the bench near the Frequency Meter SCR-211- series. For each position of the receiver band change switch, set the frequency meter to a frequency about the center of that band. Turn the receiver tuning knob and listen for heterodyne signals in the frequency meter. These indicate that radio frequency oscillator output is present. Remove the wire and replace the grid cap before proceeding.

(2) There is a quicker alternate method for checking the radio frequency oscillator. With the oscillator Tube VT-65, in the socket, tap the grid terminal with the point of a lead pencil. The oscillator is functioning if a popping noise is heard each time the grid is tapped with a pencil point.

f. Checking Radio-frequency Amplifier.—

Replace the 300 ohm resistor by a 100 $\mu\mu f$ capacitor. Leave on the 400-cycle modulation. Adjust the generator to any frequency falling within the tuning range of each position of the band switch. Leave the grid clips in place, and connect the new dummy antenna successively to the first detector, second radio-frequency, and first radio-frequency grids, and to the antenna post. Vary the generator or receiver tuning until a signal is heard in the headset, and use the minimum generator output for a comfortable indication. If no signal is heard with the signal injected at any tube, check the components of the stage immediately following.

[7]Use 470 kc for all of the high-frequency receivers, and 92.5 kc for the low-frequency models.

35. Repairs.—

a. General.—

Insert the tubes firmly all the way into their proper sockets and make firm grid cap connections. The chassis should be securely locked into its box by means of the five locking screws on the front panel. Repair service of this equipment in the field consists, almost entirely, of replacing tubes, pilot light bulbs, and fuses, and making minor repairs. Alignment and major adjustment or repair of these receivers are to be done *only* by authorized Signal Corps repair units of trained personnel, supplied with the necessary tools and instruments.

b. Cords.—

Should a cord be found defective, examine and repair the connections to the plugs. If the cord is damaged internally, temporary repairs, may be made, all joints being thoroughly insulated. Install a new cord as soon as possible.

c. Headset.—

When a headset fails to operate properly, the trouble usually is due to a defective headset cord or plug. If the damage is within the phones proper, a new headset must be secured and the defective units shipped to the proper agency for repair.

d. Dynamotors DM-17-A, DM-21-(*) and DM-21-CX.—

Normally, if these dynamotors are defective, they should be replaced. The replacement of brushes, turning down of commutators, freeing of bearings, and all repairing of defective receiver dynamotors is done at Signal Corps repair shops or at Signal Corps radio sections at air depots. Only when a replacement dynamotor cannot be obtained, or when an emergency arises, are local repairs permitted. When repairs are made locally, careful sanding in of new brushes to fit the commutator, proper spring adjustment and a running-in period are necessary to insure quiet receiver operation. If results following such local replacement of brushes are unsatisfactory, return the dynamotor to a depot for overhauling. Commutators that are not worn excessively may be cleaned by using a fine grade of sandpaper *(never use emery cloth)* and/or by wiping off thoroughly with carbon tetrachloride. If the bearings are not damaged but merely need freeing, add a drop of light

oil to each. Replace the dynamotor if the trouble is caused by an open or short-circuited winding, scored commutators, or some other serious defect.

e. Rectifier RA-20.—

Rectifier RA-20 may appear to be defective or show a low-voltage output because of a short circuit in the receiver. Disconnect the high-voltage or B+ lead to the receiver at point 7 of the connection strip, and measure the rectifier output voltage. This should be considerably higher than the normal voltage at the plate of the tube, as given in paragraph 31. If the rectifier unit appears to be defective, remove it for checking. Make individual checks of the electrolytic capacitor, the filter choke, Fuse F_3, Tube VT-97, and the power transformer, if measurements indicate the power supply to be at fault. If the rectifier is found defective, return it to an authorized Signal Corps repair station, together with the two supporting brackets.

f. Other repairs.—

Repairs other than the foregoing will not be attempted by using personnel unless specifically authorized by the provisions of appendix C, Signal Corps General Catalog.

36. Chassis Layout Illustrations.—

Chassis layout illustrations for Radio Receivers BC-312-(*), BC-312-(*)X, BC-342-(*), BC-314-(*) and BC-344-(*) are shown in figures 29 to 37.

37. Continuity Test Tables.—

a. Group 1 Terminal Board.—

(See fig. 32 for h-f receivers, and fig. 33 for Radio Receivers BC-314-(*) and BC-344-(*).) Measurements are made using the ohmmeter of Test Set I-56- series. The receivers are turned OFF during these measurements and the volume control is set at maximum. (NOTE: All measurements may vary +—20%.) On Receivers BC-342-(*) and BC-344-(*) disconnect the red wire coming from Rectifier RA-20 from the number 7 terminal of the group 6 terminal board.

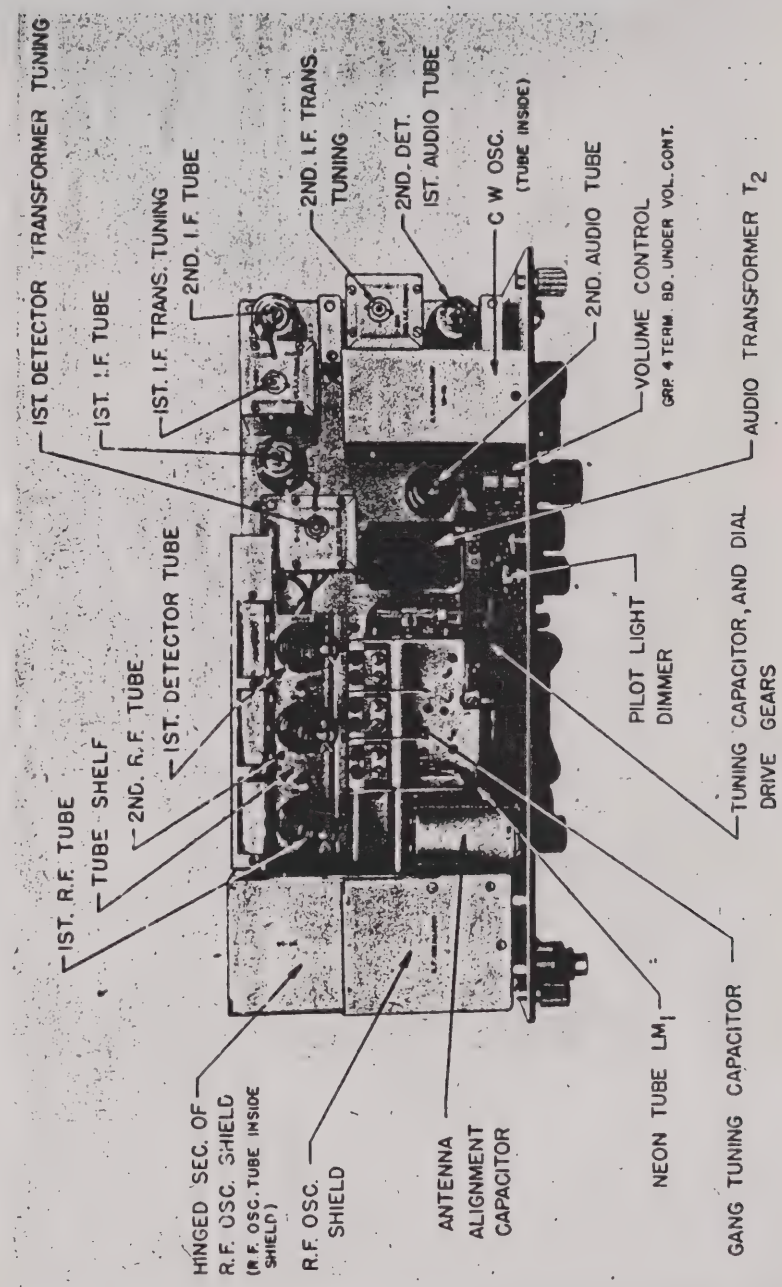


Figure 29.—Chassis layout, high-frequency models, no crystal filter, top view.

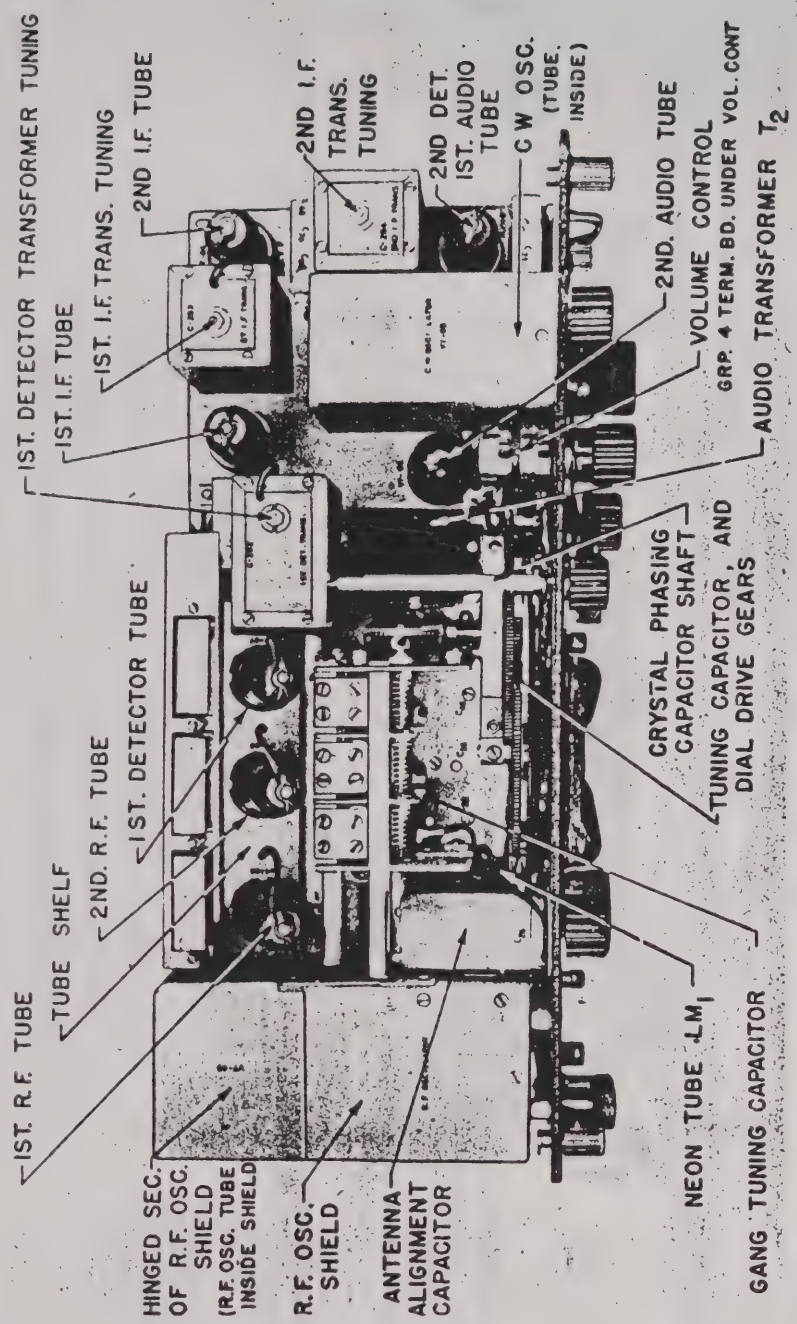


Figure 30.—Chassis layout high-frequency models, with crystal filter, top view.

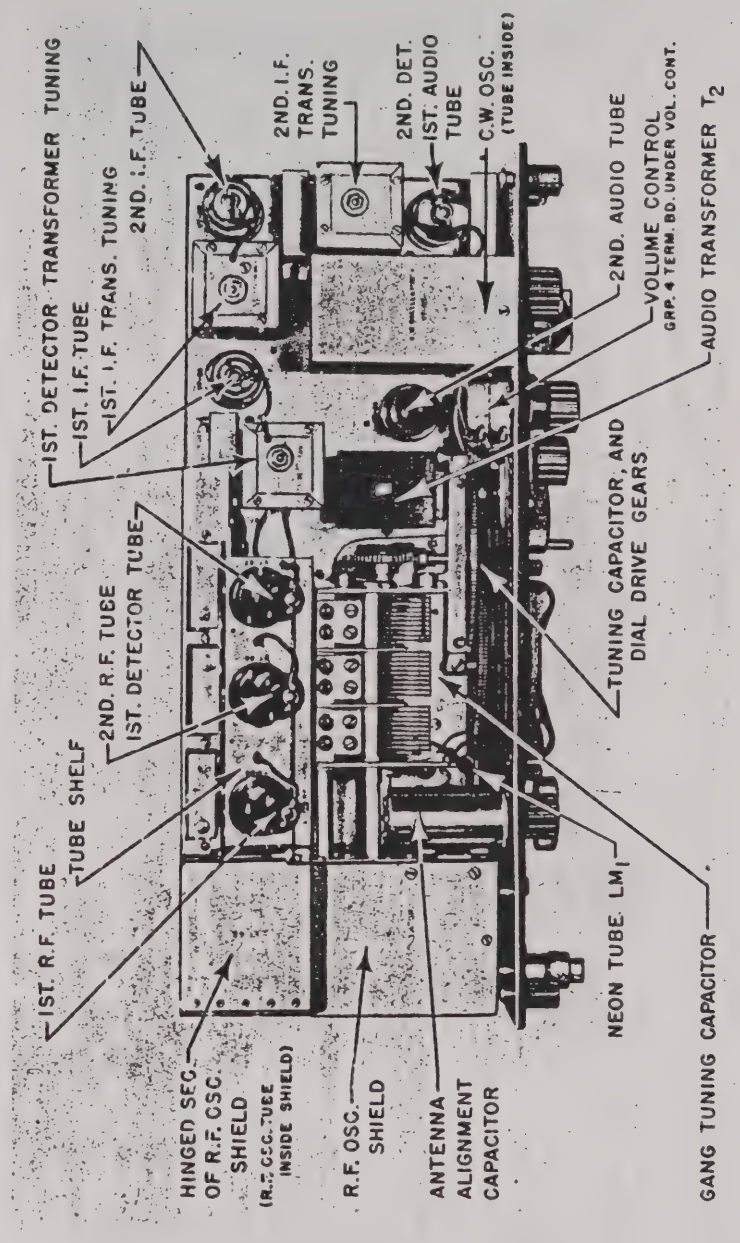


Figure 31.—Chassis layout, medium-frequency models, top view.

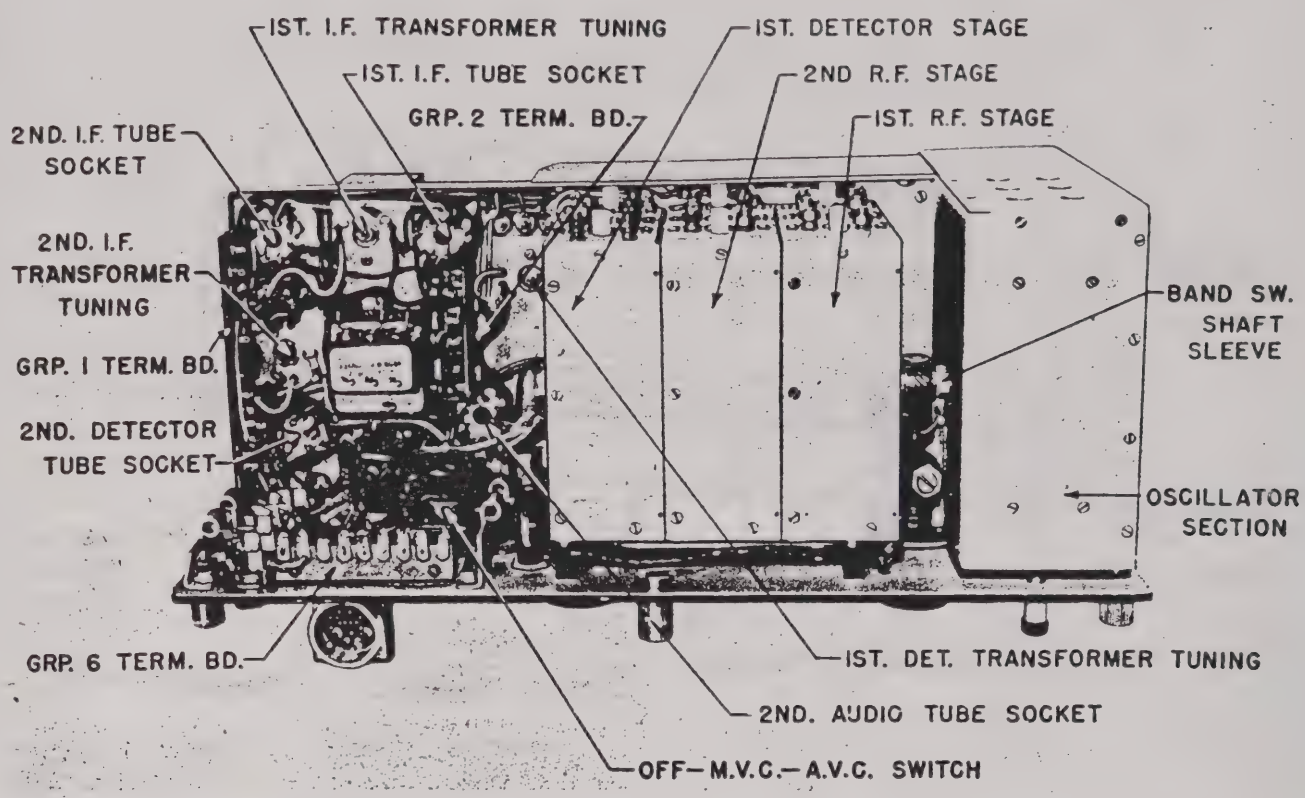


Figure 32.—Chassis layout, high-frequency models, bottom view.

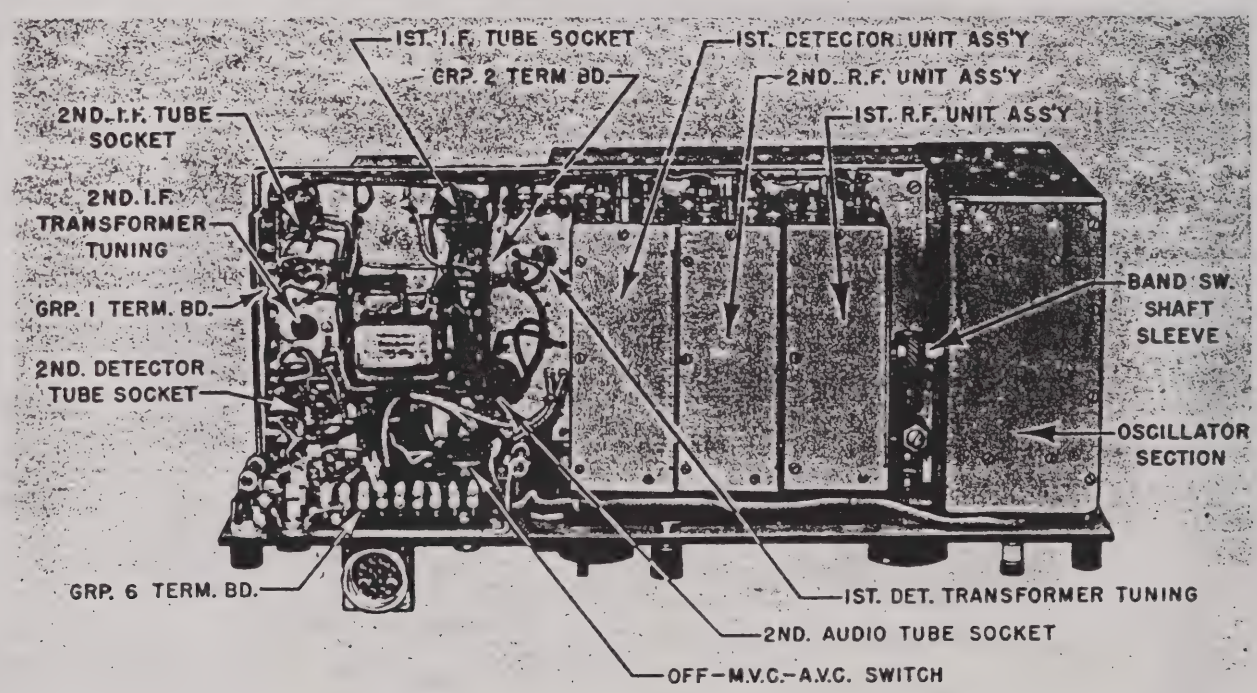


Figure 33.—Chassis layout, medium-frequency models, bottom view.

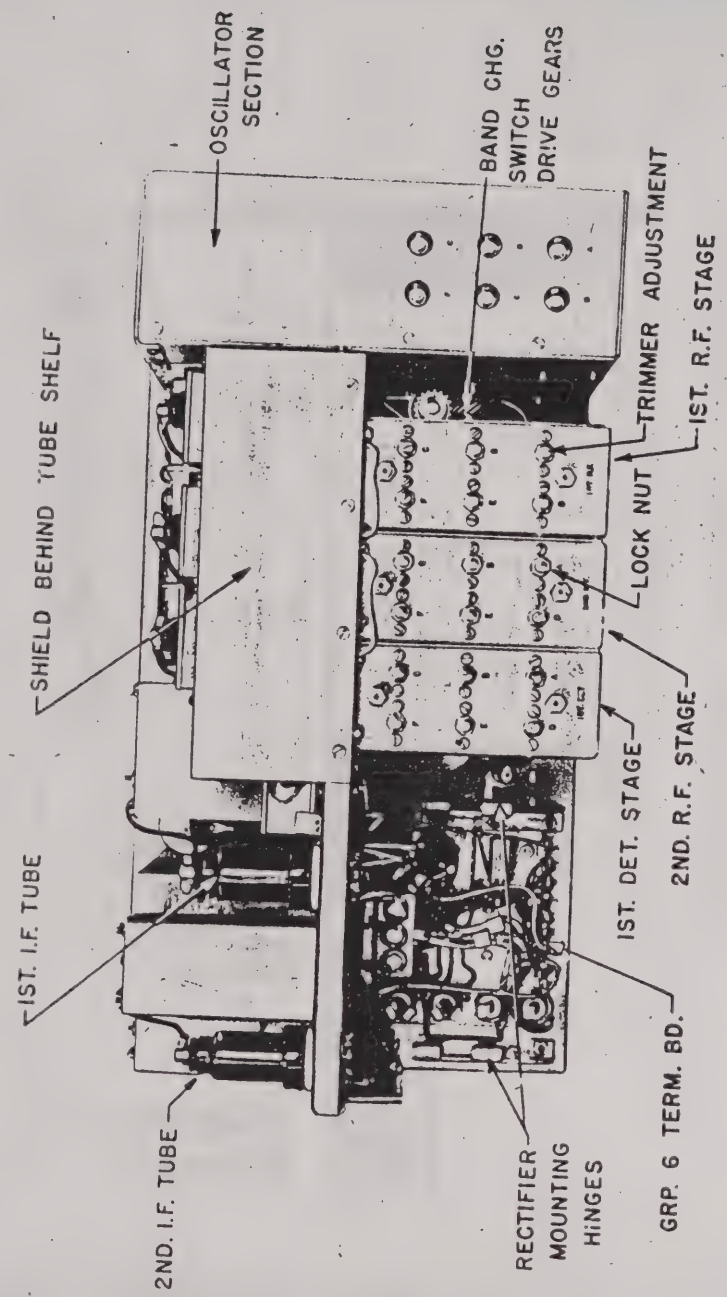


Figure 34.—Chassis layout, high-frequency models, shields and power supply removed, rear view.

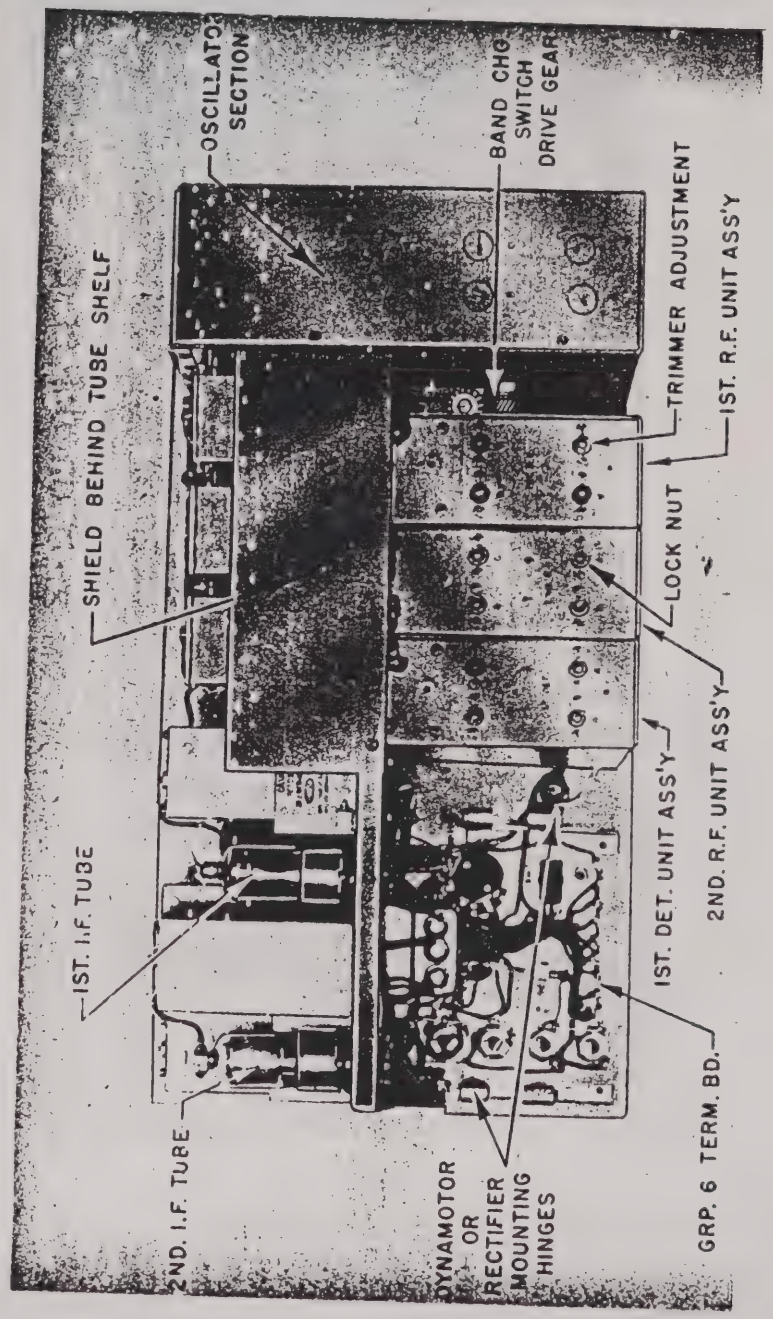


Figure 35.—Chassis layout, medium-frequency models, shields and power supply

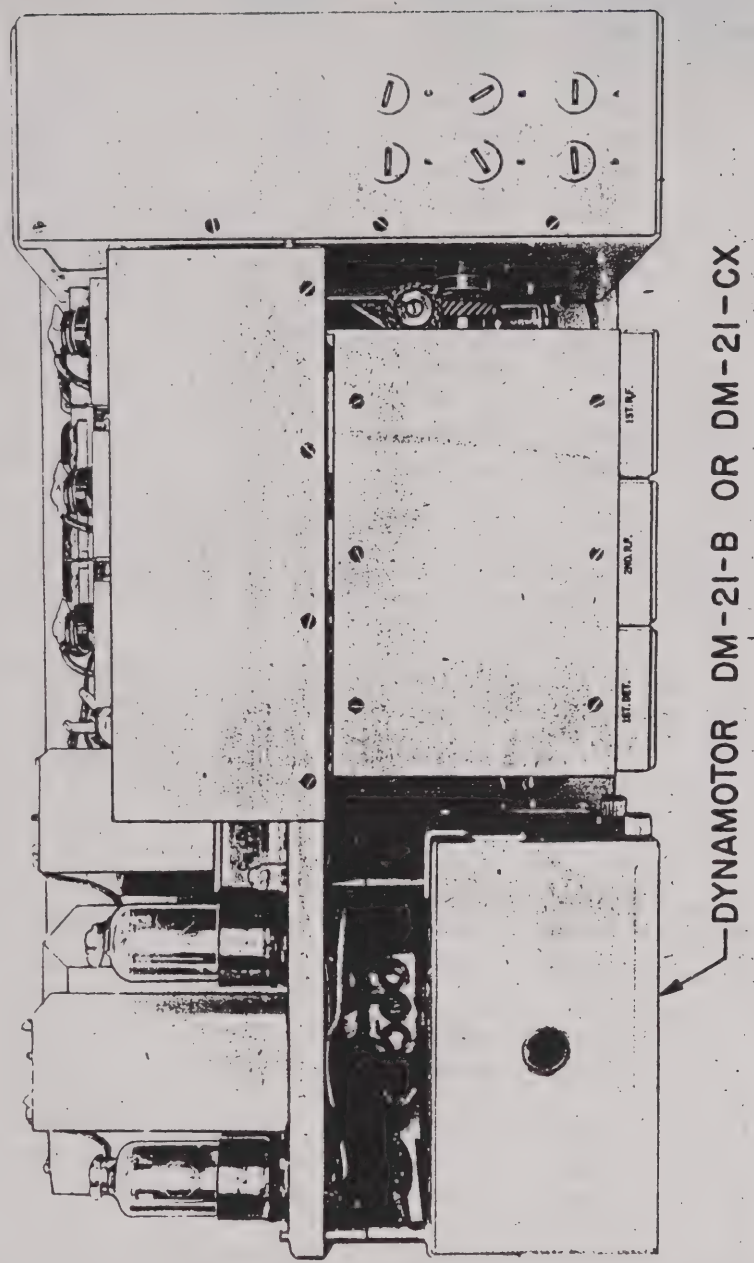


Figure 36.—Chassis layout, rear view, BC-312-(*) or BC-312-(*)X; showing Dynamotor DM-21-(*) or DM-21-CX.

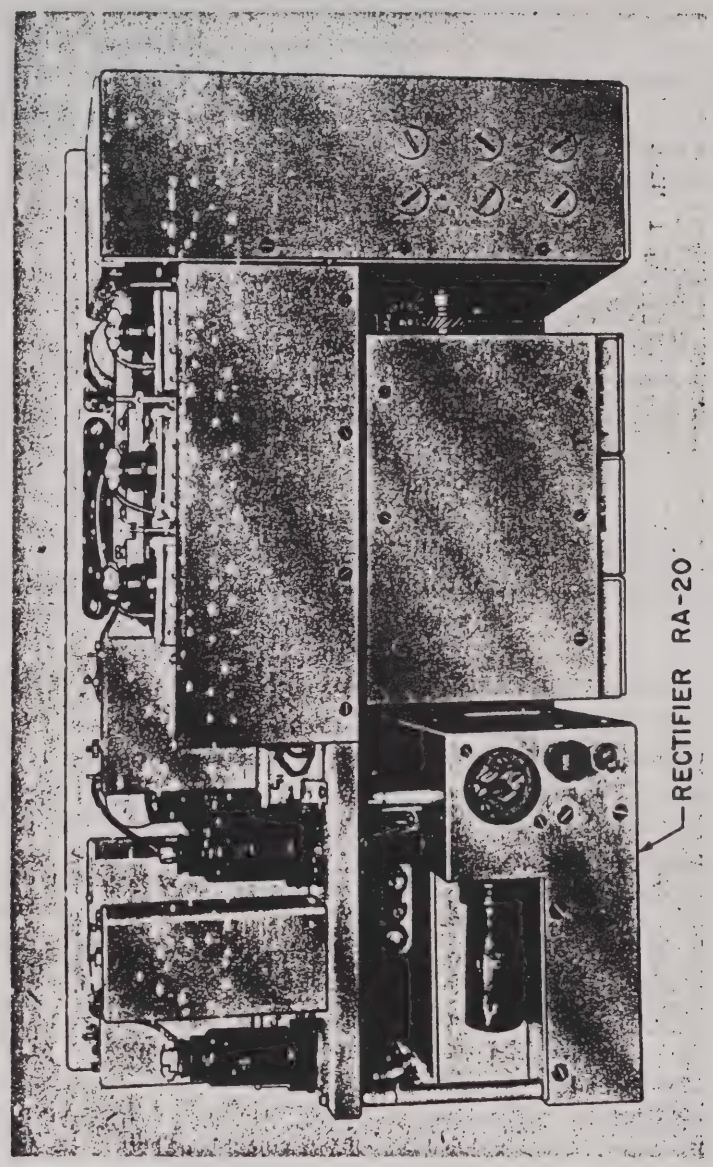


Figure 37.—Chassis layout, rear view, BC-342-(*), showing Rectifier

Measurement point across	Meter Setting	Meter Reading	Probable Cause if Reading is Incorrect
RS-171	r x 1	750 ohms	Short or open
RS-161	r x 1,000	1 megohm	Short or open
RS-162	r x 1,000	.25 megohm	Short or open
CA-279	r x 1,000	1 megohm	Short
CA-278	r x 1,000	1 megohm	Short
RS-133	r x 1,000	.5 megohm	Short or open
CA-218	r x 1,000	1 megohm	Short
CA-193	r x 1,000	.5 megohm	Short
RS-150	r x 1,000	.1 megohm	Short or open
RS-125	r x 10	1,000 ohms	Short or open
RS-149	r x 100	25,000 ohms	Short or open
RS-163	r x 100	25,000 ohms	Short or open
RS-164	r x 1	500 ohms	Short or open

b. Group 2 Terminal Board.—

(See fig. 32 for Receivers BC-312-(*), BC-312-(*)X, and BC-342-(*), and fig. 33 for Receivers BC-314-(*) and BC-344-(*).)

Measurements are made using the ohmmeter of Test Set I-56 series. The receiver is turned OFF during these measurements, and the volume control is set at maximum. On Receivers BC-342-(*) and BC-344-(*) disconnect the red wire coming from Rectifier RA-20 from the number 7 terminal of the Group 6 terminal board.

Measurement point across	Meter Setting	Meter Reading	Probable Cause if Reading is Incorrect
RS-164	r x 1	500 ohms	Short or open
RS-163	r x 100	25,000 ohms	Short or open
RS-149	r x 100	25,000 ohms	Short or open
RS-125	r x 100	1,000 ohms	Short or open
2 RS-223 (R_3 and R_{54}, parallel)	r x 100	1,000 ohms	Short or open
CA-281	r x 1,000	68,000 ohms	Short
RS-131	r x 1,000	50,000 ohms	Short or open

c. Group 4 Terminal Board.—

(See figs. 29 and 30 for Receivers BC-312-(*), BC-312-(*)X

and BC-342-(*), and fig. 31 for Receivers BC-314-(*) and BC-344-(*).)

Measurements are made using the ohmmeter of Test Set I-56 series. The receiver is turned OFF during these measurements and volume control set at maximum. On Receivers BC-342-(*) and BC-344-(*) disconnect the red wire coming from Rectifier RA-20 from the number 7 terminal of the Group 6 terminal board.

Measurement point across	Meter Setting	Meter Reading	Probable Cause if Reading is Incorrect
RS-111	r x 100	16,750 ohms	Short or open
CA-281	r x 1,000	Infinity	Short or leaky
RS-162	r x 1,000	.25 megohm	Short or open

d. Group 6 Terminal Board (Receivers BC-312-(*) and BC-314-(*)).— (See figs. 34 and 35.)—

These measurements are made using the voltmeter of Test Set I-56 series. The receivers are turned ON during these measurements and the volume control is at maximum.

Measurement point	Meter Setting	Meter Reading	Probable Cause if Reading is Incorrect
#1 to ground	50 v. d.c.	14 v.	F_1 open or no d-c supply
#2 to ground	50 v. d.c.	14 v.	F_1 open or no d-c supply
#3 to ground	50 v. d.c.	14 v.	F_1 open or no d-c supply
#4 to ground	50 v. d.c.	14 v.	F_1 open or no d-c supply
#5 to ground	50 v. d.c.	14 v.	No d-c supply to receiver
#6 to ground	----	0	This terminal is ground
#7 to ground	500 v. d.c.	245 v.	No plate supply from Dynamotor DM-21-(*)
#8 to ground	----	0	This terminal is ground
#9 to ground	50 v. d.c.	14 v.	No d-c supply

e. Group 6 Terminal Board (Receivers BC-342-(*) and BC-344-(*)).— (See figs. 34 and 35.)—

These measurements are made using the voltmeter of Test Set I-56 series. The receiver is turned ON during these measurements, and the volume control is set at maximum.

EQUIPMENT REQUIRED

1. Signal Generator I-72-(*) or equivalent.
2. Frequency Meter Set SCR-211-(*).
3. Output meter.
4. Headset or loudspeaker.
5. Dummy antennas: 50- or 100-$\mu\mu$f capacitor for r-f alignment above 1,500 kc; 250-$\mu\mu$f capacitor for alignment below 1,500 kc; 300-ohm, 1/2 or 1-watt resistor for i-f alignment.
6. Insulated alignment tools.

PROCEDURE

Turn ON signal generator and receiver. Allow these to warm up for at least 30 minutes before attempting to align the receiver. The controls on the receiver must be set as follows; the OFF-MVC-AVC knob to MVC, the VOL knob to maximum, the CRYSTAL PHASING knob to OUT, the C.W.-OSC. OFF ON switch to OFF, and the SEND-REC switch to REC. The positions of other controls will vary during the alignment and will be taken up as necessary during the procedure.

INTERMEDIATE-FREQUENCY ALIGNMENT

1. Clip the 300-ohm dummy antenna from the signal generator (see fig. 5) to the grid cap of the 1st detector tube without removing the grid clip already there.
2. Set output meter to the 150-volt scale. Connect the meter to the PHONES 2D AUDIO jack.
3. Set output controls of the signal generator to mid scale.
4. Loosen locknuts on i-f transformer screws.
5. Set signal generator to 470 kc and check the frequency with Frequency Meter Set SCR-211-(*). Use modulated signal and begin adjustments on the 2d i-f transformer, then the 1st i-f transformer, and finally the 1st detector transformer for peak output as indicated by the output meter. Use the lowest possible signal generator output that will give an indication on the output meter.
6. Tighten locknuts on adjusting screws. Take care to see that the screws are not moved during this procedure.

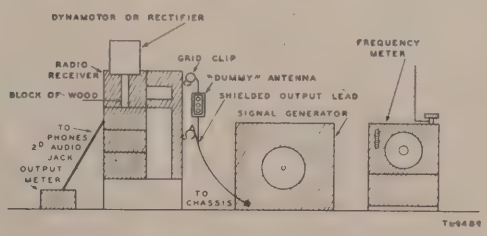


Fig. 5.—Set up test equipment, for aligning, using output meter. Frequency Meter Set SCR-211-(*) is used to check accuracy of calibration of signal generator.

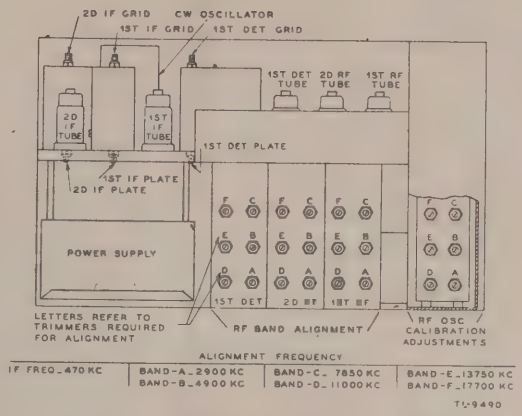


Fig. 6.—Location of adjusting trimmers, and aligning frequencies.

RADIO-FREQUENCY OSCILLATOR ALIGNMENT

1. Remove the plugs on back of the oscillator (see fig. 6), and loosen all the r-f oscillator locknuts.
2. Turn the receiver BAND CHANGE knob to band A position. Set the receiver dial to 2,900 kc.
3. Connect the generator output through a 50- or 100-$\mu\mu$f capacitor to the grid cap of the 1st detector tube. Do not remove grid clip already on tube.
4. The output meter and the ground lead are to be left as they were in the i-f alignment procedure.
5. Adjust the band A oscillator trimmer for maximum output, rock the FREQUENCY dial back and forth to be sure that the maximum response point is occuring at 2,900 kc. When adjusting, there are two trimmer settings that will produce identical results. One of these is at the image frequency, the other is the desired frequency. To avoid setting the trimmer at the image frequency, carefully observe the position of the red marking on the trimmer screw. With the receiver in normal operating position, the stator plates are below the horizontal center line of adjustment screw. When the red marking is above the center line, the capacitor is set at minimum capacitance. On bands A, B, and C, the position of the red marking, when the oscillator is tuned to the desired frequency, is the second peaking point obtained as the capacitor is rotated from its maximum capacitance position.
On bands D, E, and F, the red marking should be at the first peak obtained as the capacitor is rotated from maximum capacitance.
6. Tighten all locknuts.

ALIGNMENT OF RADIO-FREQUENCY STAGES

1. Remove the shield plate on the back of the receiver covering the r-f trimmers, and loosen the r-f band-adjusting screw locknuts.

ALIGNMENT (cont'd)

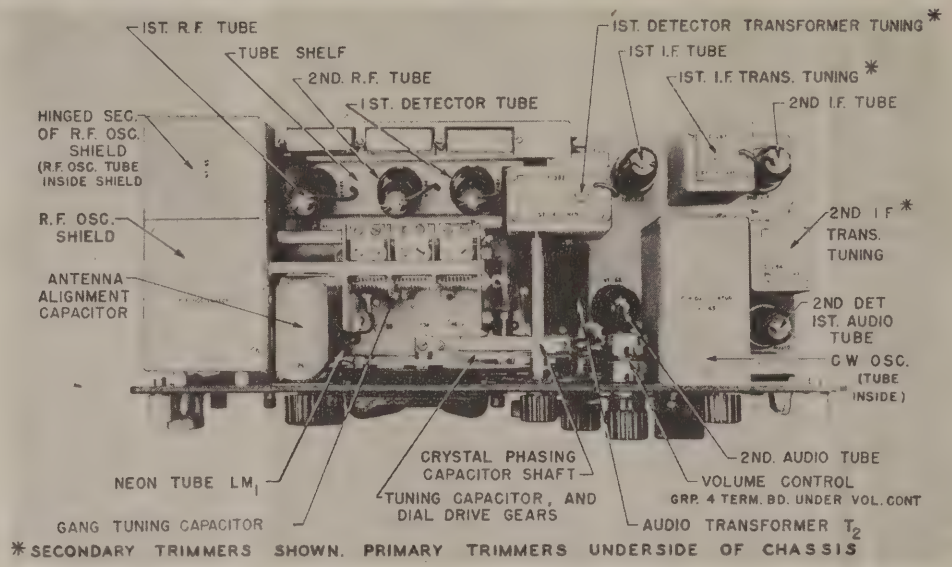


Fig. 7.—Top view illustrating locations of i-f transformer trimmers and parts location. Additional i-f trimmers will be found below chassis.

2. Connect the signal generator output or "hot" lead to the ALT SIG ANT post.
3. Set the ALIGN INPUT knob to mid position.
4. Using the alignment frequencies of figure 6, adjust the trimmers for each band for peak output in sequence from the 1st detector stage to the 1st r-f stage. Use lowest signal generator output possible. When working on trimmers of one band, do not touch trimmers of other bands. Be sure to change BAND CHANGE switch, signal generator frequency, and receiver tuning dial band when changing from one band to the next.
5. Tighten lock nuts of adjusting screws.

ADJUSTMENT OF C-W OSCILLATOR

1. Turn C.W.-OSC. switch ON.
2. Connect signal generator "hot" lead to grid of 1st detector as in previous steps, *with modulation "off"*.
3. Set generator for 470 kc.
4. Turn C.W. ADJUST knob so that arrow is in vertical position.
5. Unscrew plug above oscillator switch; behind it is the beat oscillator trimmer screw. Adjust this for zero beat. Turn the receiver tuning knob to make sure that no incoming signals are interfering with the adjustment.
6. Turn C.W. OSC. switch OFF, replace plug over trimmer screw.

CHECKING AND ALIGNING CRYSTAL FILTER CIRCUIT

When all previously described alignment adjustments have been made, the crystal filter circuit may then be checked in the following manner:

1. Turn CRYSTAL PHASING control from OUT position and adjust for *minimum* background noise. Make sure receiver CW oscillator is OFF.
2. Set signal generator for an unmodulated r-f signal.
3. Turn the tuning dial of the receiver back and forth across the frequency for which the signal generator is set. A musical chirp should be heard in the headset or loudspeaker. This indicates that the quartz crystal is being excited by the varying i-f signal produced by the above tuning operation. The effect will be more pronounced for one direction of tuning.
4. To align the crystal filter circuit, refer back to directions given for i-f alignment. In this instance turn CRYSTAL PHASING knob from OUT position and set for *minimum* background noise.
5. Connect signal generator, with modulation "on", through 300 ohm dummy antenna to the grid cap of the 1st detector tube leaving set grid lead connected.
6. Carefully vary the generator frequency above and below 470 kc to bring the output to exact coincidence with the frequency of the crystal. This is indicated by peak reading on the output meter. When the exact peak is obtained, readjust the trimmer of the secondary of the 1st detector i-f transformer for max. on output meter. These adjustments will be critical. (If a signal generator with a modulation frequency of 60 or 100 cycles is available, instead of 400 cycles modulation, better crystal filter alignment can be performed.)
7. Repeat the i-f stages, after the crystal filter has been adjusted, as outlined previously. NOTE: If maximum sensitivity is desired with crystal filter OUT, then align the i-f's with filter OUT. If maximum sensitivity is desired with crystal filter IN, then align i-f transformers with crystal filter in operation.

LOCATING TROUBLE

SERVICE NOTES

The following possible causes of trouble are suggested in the event that a receiver becomes inoperative. These causes, given for various symptoms, are listed in the order of their probability. This sequence of examination for trouble should be followed in order to localize the defect and remedy it as quickly as possible.

Symptom	Cause
No high voltage (D.C.)	Open fuse in panel.
	Open fuse in rectifier.
	Defective (shorted) filter capacitor; check C-89, C-90 (in RA-20), C-80, and C-74.
	Defective rectifier tube (VT-97) in case of BC-342-(*).
	Defective dynamotor in BC-312-(*).
No plate voltage	Shorted bypass capacitor in plate circuit of stage.
	Open resistor in plate lead of stage.
	Open plate circuit component; in i-f stage, i-f transformer primary; in r-f stage, r-f coil primary (also band changing switch making poor contact); in a-f stage, audio transformer primary winding.
No screen voltage	Open screen resistor in particular stage where screen voltage is lacking.
	Shorted screen bypass capacitor in this stage.
No signal at output	Dead tube or tubes.
	Unsoldered or loose connections.
	Open primary and secondary windings of T_1 and T_2.
	Capacitor C-81 open circuited.
	Check volume control R-34.

COMMON FAULTS AND CORRECTIVE MEASURES

Inoperative BC-342-(*) is due in many instances to failure (short circuit) of filter capacitor C-80. This capacitor, with C-79 and C-78, is encased in one unit to form CA-276. The failure of this capacitor is due to overheating as a result of the small clearance between CA-276 and RA-20 (power supply).

The remedy is to relocate CA-276 to a position on the receiver subpanel where air can circulate around it. Complete relocation details of this modification are shown in figure 8. More complete data can be obtained from OCSigO Maintenance Letter No. 10, 20 Jan 1943.

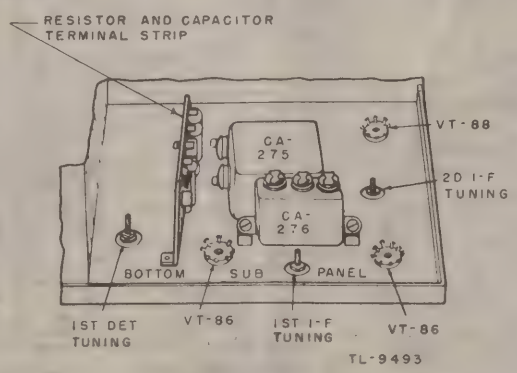
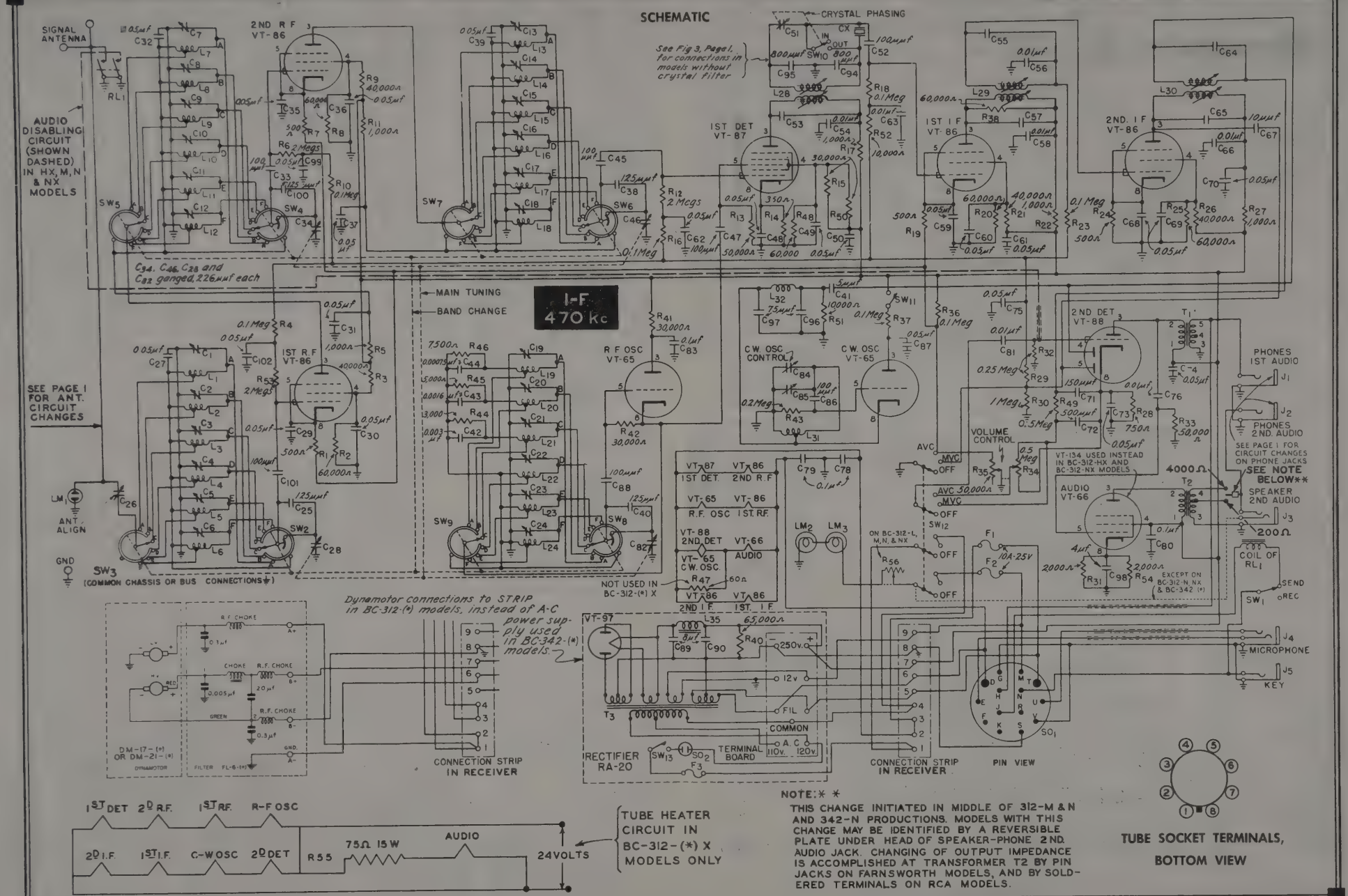


Fig. 8.—Recommended new location of capacitor CA-276 on receiver sub-panel to minimize heat effect from Rectifier RA-20.



NOTE: * *

THIS CHANGE INITIATED IN MIDDLE OF 312-M & N AND 342-N PRODUCTIONS. MODELS WITH THIS CHANGE MAY BE IDENTIFIED BY A REVERSIBLE PLATE UNDER HEAD OF SPEAKER-PHONE 2ND AUDIO JACK. CHANGING OF OUTPUT IMPEDANCE IS ACCOMPLISHED AT TRANSFORMER T2 BY PIN JACKS ON FARNSWORTH MODELS, AND BY SOLDERED TERMINALS ON RCA MODELS.

Measurement point	Meter Setting	Meter Reading	Probable Cause if Reading is Incorrect
#1 to ground	----	0	110 to 120 v. a.c. short to ground
#2 to ground	10 v. a.c.	6.3 v.	F_1 or filament winding on T_3 open
#3 to ground	10 v. a.c.	6.3 v.	F_1 or filament winding on T_3 open
#4 to ground	----	0	110 to 120 v. a.c. short to ground
#5 to ground	10 v. a.c.	6.3 v.	Filament winding on T_3 open
#6 to ground	10 v. a.c.	6.3 v.	Filament winding on T_3 open
#7 to ground	500 v. d.c.	250 v.	No plate supply from Rectifier RA-20
#8 to ground	----	0	This terminal is ground
#9 to ground	25 v. a.c.	13 v.	Auxiliary winding on T_3 open

f. Group 6 Terminal Board (Receiver BC-312-(*)X).—See fig. 34).—

Measurements are made using the voltmeter of Test Set I-56 series. The receiver is turned ON during these measurements, and volume control is set at maximum.

Measurement point	Meter Setting	Meter Reading	Probable Cause if Reading is Incorrect
#1 to ground	50 v. d.c.	28 v.	F_1 open or no d-c supply
#2 to ground	50 v. d.c.	28 v.	F_1 open or no d-c supply
#3 to ground	50 v. d.c.	28 v.	F_1 open or no d-c supply
#4 to ground	50 v. d.c.	28 v.	F_1 open or no d-c supply
#5 to ground	50 v. d.c.	28 v.	No d-c supply to receiver
#6 to ground	----	0	This terminal is ground
#7 to ground	500 v. d.c.	245 v.	No plate supply from Dynamotor DM-21-CX
#8 to ground	----	0	This terminal is ground
#9 to ground	50 v. d.c.	28 v.	No d-c supply

g. Socket SO-94 for Receivers BC-312-(*), BC-312-(*)X and BC-3,4-(*).—

Measurements are made using the ohmmeter of Test Set I-56 series. The receivers are turned OFF during these measurements, and Plug PL-114 is removed from Socket SO-94. Resistance values are between indicated terminal and ground.

Terminal	Meter Setting	Meter Reading	Probable Cause if Reading is Incorrect
D	r x 1	0	Ground terminal inside dynamotor not grounded
G	r x 1	0	Open wiring
M	r x 1,000	Infinity	Shorted wiring
T	r x 1,000	Infinity	Shorted wiring
U	r x 1,000	Infinity	Shorted wiring or short in Jack J_4
V	r x 1	0	Open wiring
S	r x 100	17,000	Open circuit in dynamotor or open wiring
K	r x 1,000	Infinity	K should not be wired into receiver
F	r x 1,000	Infinity	F should not be wired into receiver
E	r x 1,000	Infinity	Shorted wiring or short in Jack J_4
H	r x 1	650	Open secondary in transformer T_1 or open wiring
N	r x 1,000	Infinity	Shorted wiring or short in Jack J_5
R	r x 1,000	Infinity	R should not be wired into receiver
J	r x 1,000	Infinity	Shorted wiring

h. Socket SO-94 for Receivers BC-342-(*) and BC-344-(*).

Measurements are made using the ohmmeter of Test Set I-56 series. The receiver is turned OFF during these measurements, and Cord CD-370 is removed from Rectifier RA-20. Resistance values are between terminal indicated and ground.

Terminal	Meter Setting	Meter Reading	Probable Cause if Reading is Incorrect
D	r x 1	0	Open filament winding on power transformer or open wiring
G	r x 1	0	Open wiring
M	r x 1	0	Open auxiliary 12 v. winding on power transformer or open wiring
T	r x 1	0	Open filament winding on power transformer or open wiring
U	r x 1,000	Infinity	Shorted wiring or short in J_4
V	r x 1	0	Open wiring
S	r x 1	0	Open wiring
K	r x 1,000	Infinity	K should not be wired into receiver
F	r x 1,000	Infinity	F should not be wired into receiver
E	r x 1,000	Infinity	Shorted wiring or short in jack J_4
H	r x 1	650	Open secondary in transformer T_1 or open wiring
N	r x 1,000	Infinity	Shorted wiring or short in jack J_5
R	r x 1,000	Infinity	R should not be wired into receiver
J	r x 1,000	Infinity	Shorted wiring

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i. Jacks J_1, J_2, J_3, J_4, and J_5 for Receivers BC-312-(*), BC-312-(*)X, BC-342-(*), BC-314-(*) and BC-344-(*).—

Measurements are made using the ohmmeter of Test Set I-56-series The receivers are turned OFF during these measurements. Plug PL-114 and Cord CD-370 are removed from the receiver. Resistance values are between indicated terminal and ground.

Terminal	Meter Setting	Meter Reading	Probable Cause if Reading is Incorrect
J_1 tip	r x 1	600[1]	Open secondary in T_2[2], open or shorted wiring, shorted J_2 or J_3
J_1 sleeve	r x 1	0	Open wiring
J_2 tip	r x 1	600	Open secondary in T_2[2], open or shorted wiring, shorted J_1 or J_3
J_2 sleeve	r x 1	0	Open wiring
J_3 tip	r x 1	600	Open secondary in T_2, open or shorted wiring, shorted J_1 or J_2
J_3 sleeve	r x 1	0	Open wiring
J_3 ring	r x 1,000	Infinity	Shorted J_3
J_4 tip	r x 1,000	Infinity	Shorted wiring or shorted J_4
J_4 ring	r x 1,000	Infinity	Shorted wiring or shorted J_4
J_4 sleeve	r x 1	0	Open wiring
J_5 tip	r x 1,000	Infinity	Shorted wiring
J_5 sleeve	r x 1	0	Open wiring

j. Volume Control for Receivers BC-312-(*), BC-312-(*)X BC-342-(*), BC-314-(*) and BC-344-(*).—

Measurements are made using the ohmmeter of Test Set I-56 series. The receivers are turned OFF during these measurements and volume control is set at maximum. Resistance values are between indicated terminal and ground.

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[1]650 in BC-312 to BC-312-J, BC-342- to BC-342-J, BC-314 to BC-314-F, and BC-344.

[2]T_1 in BC-312 to BC-312-J, BC-342 to BC-342-J and BC-344.

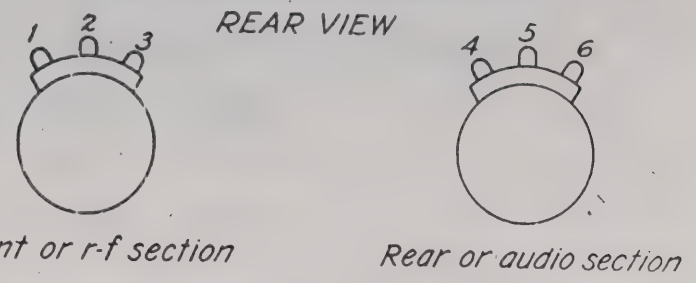


Figure 38.—Location of terminals on volume control.

Terminal	Meter Setting	Meter Reading	Probable Cause if Reading is Incorrect
1	r x 1,000	50,000 ohms	Open volume control
2	r x 1	0	Open wiring
3	r x 1	5 to 25 ohms	Open or shorted volume control or wiring
4	r x 1	750 ohms	Open or shorted wiring, shorted volume control or capacitor
5	r x 1,000	.5 megohm	Open or shorted volume control or wiring
6	r x 1,000	.5 megohm	Open or shorted volume control or wiring

k. OFF-MVC-AVC Switch.—

Measurements are made using the ohmmeter of Test Set I-56 series. The receiver is turned OFF during these measurements. The volume control and the dial light dimmer-rheostat

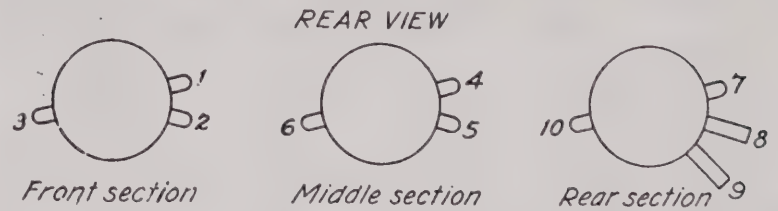


Figure 39.—Location of terminals on OFF-MVC-AVC switch.

(in BC-312-L, M, N, and NX) are both set at maximum. Plug PL-114 or Cord CD-370 must not be attached to the receiver. Resistance values are between indicated terminal and ground.

(1) *For Receivers BC-312-(*) and BC-314-(*).*—

Terminal	Meter Setting	Meter Reading	Probable Cause if Reading is Incorrect
1	r x 1	5 to 25 ohms	Open or shorted volume control or wiring, defective switch
2	r x 1,000	1 megohm	Open or shorted wiring or defective switch
3	r x 1	0	Open wiring
4	r x 1,000	.5 megohm	Open or shorted volume control or wiring
5	r x 1,000	.5 megohm	Open or shorted volume control or wiring
6	r x 1,000	Infinity	Shorted capacitor or defective switch
7	r x 1,000	Infinity	Shorted wiring
8	r x 1	30 ohms	Pilot lights burned out or defective wiring
9	r x 1,000	Infinity	Shorted wiring
10	r x 1	0.5 ohm	Tube filament open, open or short circuit in dynamotor or wiring

(2) *For Receiver BC-312-(*)X.*—

Terminal	Meter Setting	Meter Reading	Probable Cause if Reading is Incorrect
1	r x 1	5 to 25 ohms	Open or shorted volume control or wiring, defective switch
2	r x 1,000	1 megohm	Open or shorted wiring or defective switch
3	r x 1	0	Open wiring
4	r x 1,000	.5 megohm	Open or shorted volume control or wiring
5	r x 1,000	.5 megohm	Open or shorted volume control or wiring
6	r x 1,000	Infinity	Shorted capacitor or defective switch
7	r x 1,000	Infinity	Shorted wiring
8	r x 1	100 ohms	Pilot lights burned out or defective wiring
9	r x 1,000	Infinity	Shorted wiring
10	r x 1	3.5 ohms	Tube filament open, open or short circuit in dynamotor or wiring

(3) *For Receivers BC-342-(*) and BC-344-(*).*—

Terminal	Meter Setting	Meter Reading	Probable Cause if Reading is Incorrect
1	r x 1	5 to 25 ohms	Open or shorted volume control or wiring, defective switch
2	r x 1,000	1 megohm	Open or shorted wiring, defective switch
3	r x 1	0	Open wiring
4	r x 1,000	.5 megohm	Open or shorted volume control or wiring
5	r x 1,000	.5 megohm	Open or shorted volume control or wiring
6	r x 1,000	Infinity	Shorted capacitor or defective switch
7	r x 1	0	Open auxiliary 12 v. winding on power transformer or open wiring
8	r x 1	30 ohms	Pilot light burned out, shorted or open wiring
9	r x 1,000	Infinity	Shorted wiring
10	r x 1,000	Infinity	Short in wiring or switch

1. *Tube Socket Resistance Tables for High-frequency Receivers.*—

Measurements are made using the ohmmeter of Test Set I-56 series. The OFF-MVC-AVC switch is at OFF during these measurements, except where AVC is indicated, the volume control is set at maximum, the continuous-wave oscillator is turned ON, the BAND CHANGE switch is set on Band A (1500-3000 kc). Plug PL-114, or Cord CD-370, is not connected to the receiver being measured. On Receiver BC-342-(*), disconnect the red wire coming from Rectifier RA-20 from the number 7 terminal of the group 6 terminal board. Resistance values are between the terminal indicated and ground, and are expressed in ohms.

Tubes	Cathode	Plate	Screen	Grid (AVC)
1st r-f VT-86	500	17,750	25,000	3.35 meg
2d r-f VT-86	500	17,750	25,000	3.35 meg
1st detector VT-87	350	17,750	20,000	3.35 meg
1st i-f VT-86	500	17,750	25,000	1.26 meg
2d i-f VT-86	500	17,750	25,000	1.35 meg
2d detector VT-88	750	17,750	- - - -	250,000
2d audio VT-66 or VT-134	1,000	17,500	16,750	50,000
R-f oscillator VT-65	7,500	46,750	- - - -	37,500
C-w oscillator VT-65	0	117,250	- - - -	200,000

m. Tube Socket Resistance Tables for Medium-frequency Receivers.—

Measurements are made using the ohmmeter of Test Set I-56 series. The receivers are turned OFF during these measurements, except where AVC is indicated, the volume control is set at maximum, the continuous-wave oscillator is turned ON, and the BAND CHANGE switch is set on Band A (150 to 260 kc). Plug PL-114 or Cord CD-370 is not connected to the receiver being measured. On Radio Receiver BC-344-D, disconnect the red wire coming from Rectifier RA-20 from the number 7 terminal of the Group 6 terminal board. Resistance values are between indicated terminal and ground and are expressed in ohms.

Tubes	Cathode	Plate	Screen	Grid (AVC)
1st r-f VT-86	350	19,000	36,000	1.35 meg
2d r-f VT-86	350	19,000	36,000	1.35 meg
1st detector VT-87	500	19,000	26,000	1.35 meg
1st i-f VT-86	500	19,000	34,000	1.35 meg
2d i-f VT-86	500	19,000	32,000	2.35 meg
2d detector VT-88	750	19,000	----	.25 meg
2d a-f VT-66	1,000	19,000	19,000	.25 meg
R-f oscillator VT-65	0	54,000	----	50,000
C-w oscillator VT-65	0	300,000	----	.2 meg

38. Removal and Assembly of Parts.—

a. Replacement of Radio-frequency Unit Assembly.—

Turn the BAND CHANGE knob to Band A and remove the set screw in the switch shaft sleeve (see figures 34 and 35). Then remove the single plug in the side of the r-f oscillator cover at the end of the receiver. By means of long nose pliers, draw the switch shaft through the hole. Remove the shield behind the tube shelf. Remove the shield behind the coil boxes and remove both round-head screws at the front, and the two spacer studs at the rear corners of the tube shelf. Raise the tube shelf as far off the mounting shelf as it will go. Make certain that the gang-tuning capacitor is closed; then unsolder the connections to the radio-frequency units and remove the screws which hold the units to the mounting shelf. Tag each wire so it will be replaced correctly. The unit may now be removed. When replacing the unit, be sure that the switches in the unit are in position for Band A before replacement. Be sure all connections are made correctly before resoldering the wires.

b. Replacement of Radio-frequency Oscillator Unit Assembly.

Remove the screws holding the outer cover, which incloses the upper and lower compartments. Then remove the outer cover. Unsolder the four leads from the terminal panel below the tube socket. Tag each wire so it will be replaced correctly. Remove the four screws holding the unit to the bottom of the shield compartment. The unit may now be withdrawn from the chassis without removing the band switch shaft. When replacing the unit, make sure the switches in the unit are in the same position as the switch shaft.

c. Replacement of Rectifier RA-20 and Dynamotors DM-21-(*) and DM-21-CX.—

Unsolder the connections to the power unit at the connection strip and remove them in a group. The connections should be noted or tagged so that they will be replaced correctly. Remove the two screws adjacent to the 1st and 2nd intermediate-frequency tube sockets which secure the two mounting-support posts at the back of the power unit. Remove the two stud bolts which holds the hinge sections together, or remove the six screws holding the power unit hinges to the front panel.

39. Alignment.—

a. Apparatus Set-up.—

Figure 40 shows a typical set-up for an alignment job. Note especially that the receiver is standing upright. In this position, all the adjusting screws and controls are readily accessible. The illustration shows the most usual combination of apparatus available under field conditions, as listed in paragraph 39*c*.

b. Dynamotor or Rectifier Support.—

The primary adjusting screws of the three intermediate-frequency transformers are on the under side of the chassis. In order to reach them, it is necessary to remove one mounting stud of the dynamotor or rectifier and to swing the latter up on its outer hinge. Before touching the receiver, cut a piece of scrap wood 6 inches long and about 1 inch by ½ or ¾ inch in cross section. Stand

the receiver on its oscillator-compartment end. Find the two small cap screws close to the first and second intermediate-frequency tubes and remove them; the studs or collars through which these screws pass will fall out. Loosen and then pull out the long screw passing through the inner hinge of the dynamotor or rectifier.

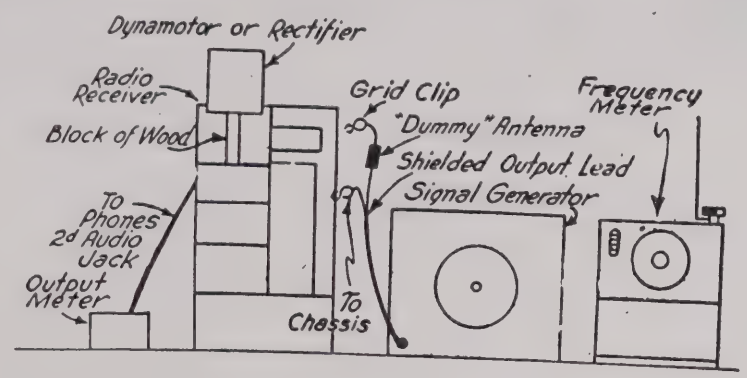


Figure 40.—Set-up of receivers and test equipment for receiver alignment.

(When the receiver is upright, this will be the *lower* hinge.) The unit is now loose. Raise it slowly, making sure that the connecting wires are free, and prop it upright by means of the wood block. The unit is heavy, and will keep the block in place rather securely.

c. Equipment.

The following equipment will be required for proper receiver alignment:

(1) Signal Generator I-72 series, or equal.
(2) Headset or loudspeaker.
(3) Dummy antennas (50-$\mu\mu$f capacitor for radio-frequency alignment for 1500 kc and above; 250-$\mu\mu$f capacitor for alignment below 1500 kc; 300-ohm resistor for intermediate-frequency alignment).
(4) Frequency Meter SCR-211 series.
(5) Test Set I-56 series.
(6) Alignment tools.
(7) Special battery cord and battery.
(8) Plug PL-55 (or equal) for output meter.

d. Precautions Prior to Alignment.—

Before an attempt is made to align or calibrate a receiver, it is essential that all components be operating satisfactorily. It is assumed that all the tubes have average constants. The receiver must be warmed up for about an hour prior to alignment. This is to permit stabilization of the radio-frequency circuits and other circuit elements. The signal generator and frequency meter also must have about an hour warm-up before an alignment is attempted. In connecting the receiver for alignment and calibration, be very careful that the sensitive meter located in the signal generator is not shorted to ground by the power supply employed in the receiver. Attenuators and meters of certain signal generators burn out very easily if improperly grounded. Check to ascertain that the same side of the power line is grounded in both signal generator and receiver in the case of the a-c operated receivers. Since no fuses are provided in the output circuits of signal generators, it is impossible to provide protection against this source of trouble. BE VERY CAREFUL IN HANDLING THIS EQUIPMENT. The signal generator must be placed as close to the receiver as possible to enable the use of short leads. Long leads serve no useful purpose and often cause the equipment to operate erratically. Some of the alignment screws for the i-f transformers cannot be reached unless the dynamotor unit is removed. Instructions for the removal of components are given in paragraph 39*b*. Note the locking arrangement on the i-f alignment screws. IT IS IMPERATIVE THAT THE LOCKING NUT BE RELEASED BEFORE THE ADJUSTING SCREW IS TURNED. Be very careful when manipulating the alignment screws.

e. Receiver markings.—

(1) *Radio-frequency letter markings.*—

Receivers BC-314-(*) and BC-344-(*) have four band positions. The trimmer capacitor adjustment screws associated with each band are similarly marked by letters A through D, inclusive. The BC-312-(*), BC-312-(*)X, and BC-342-(*), having six band positions, are marked by letters A through F.

(2) *Radio-frequency capacitance markings.*—

The trimmer capacitor adjustment screws, in addition to the band letter markings, show the relative value of capacitance included in the circuit. A red dot is located on one side of the screw

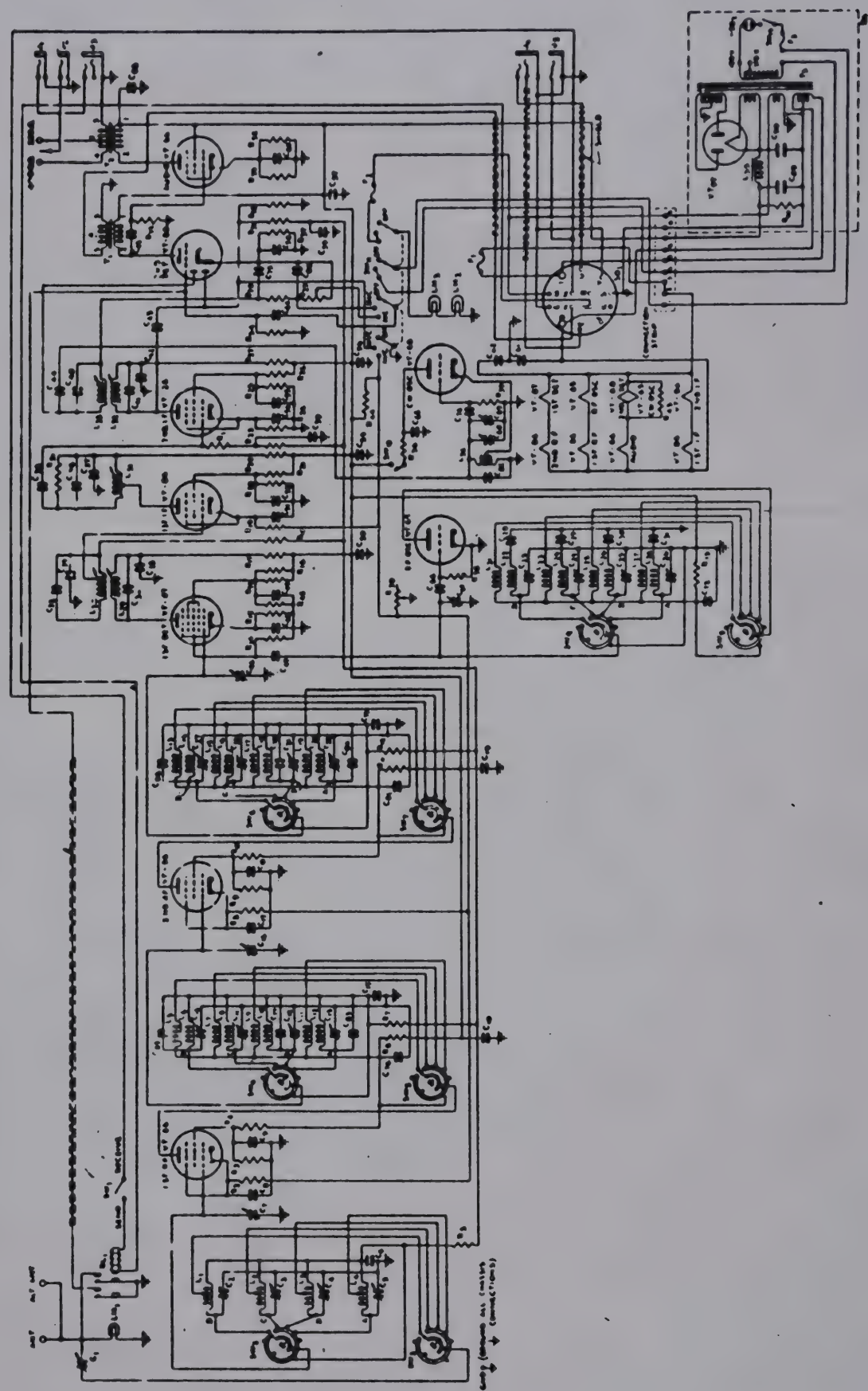
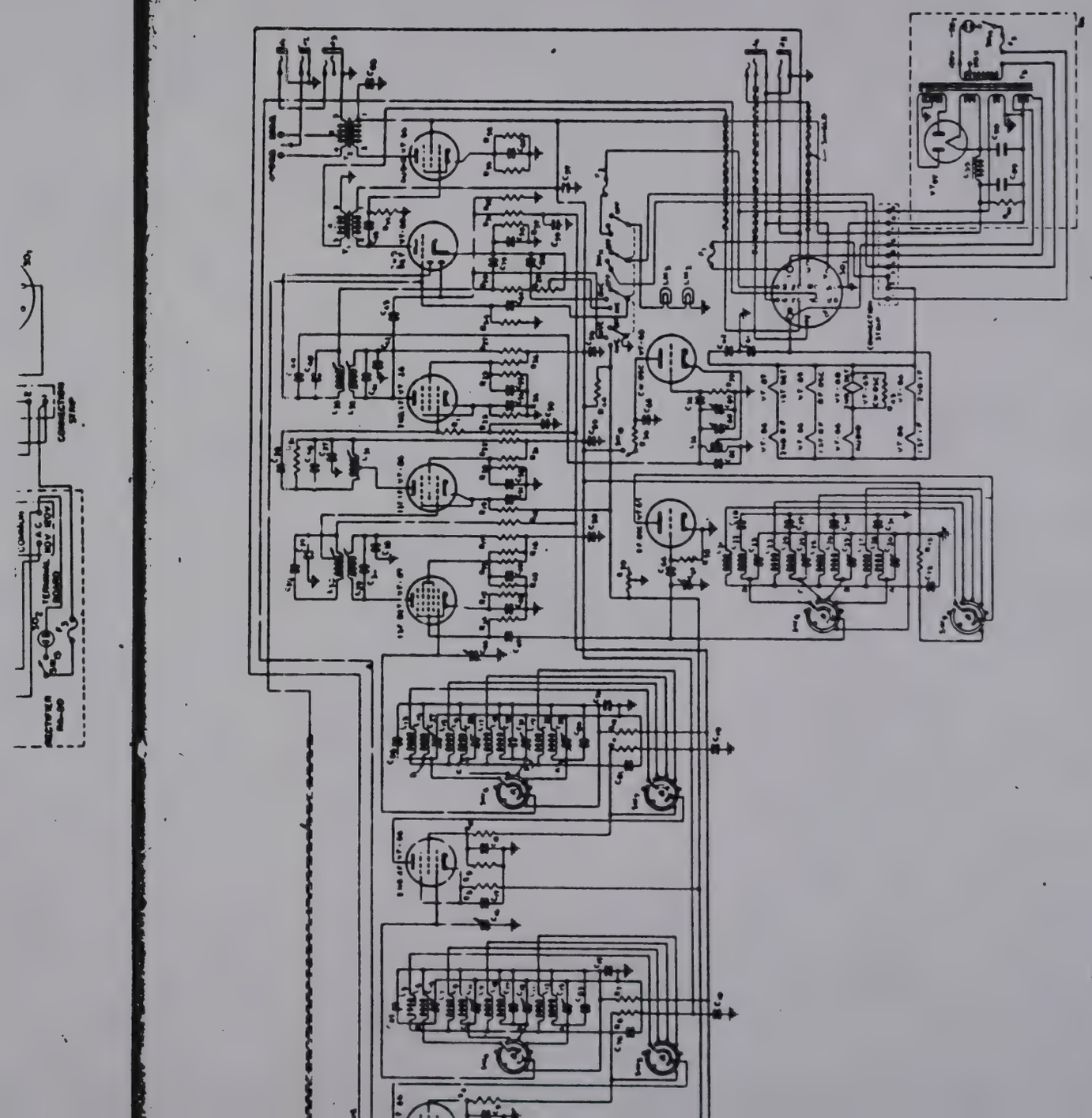


Figure 16.—Schematic diagram, Receiver BC-344-(*).

RADIO RECEIVERS BC-312-(*), BC-312-(*)X,
BC-342-(*), BC-314-(*) AND BC-344-(*)



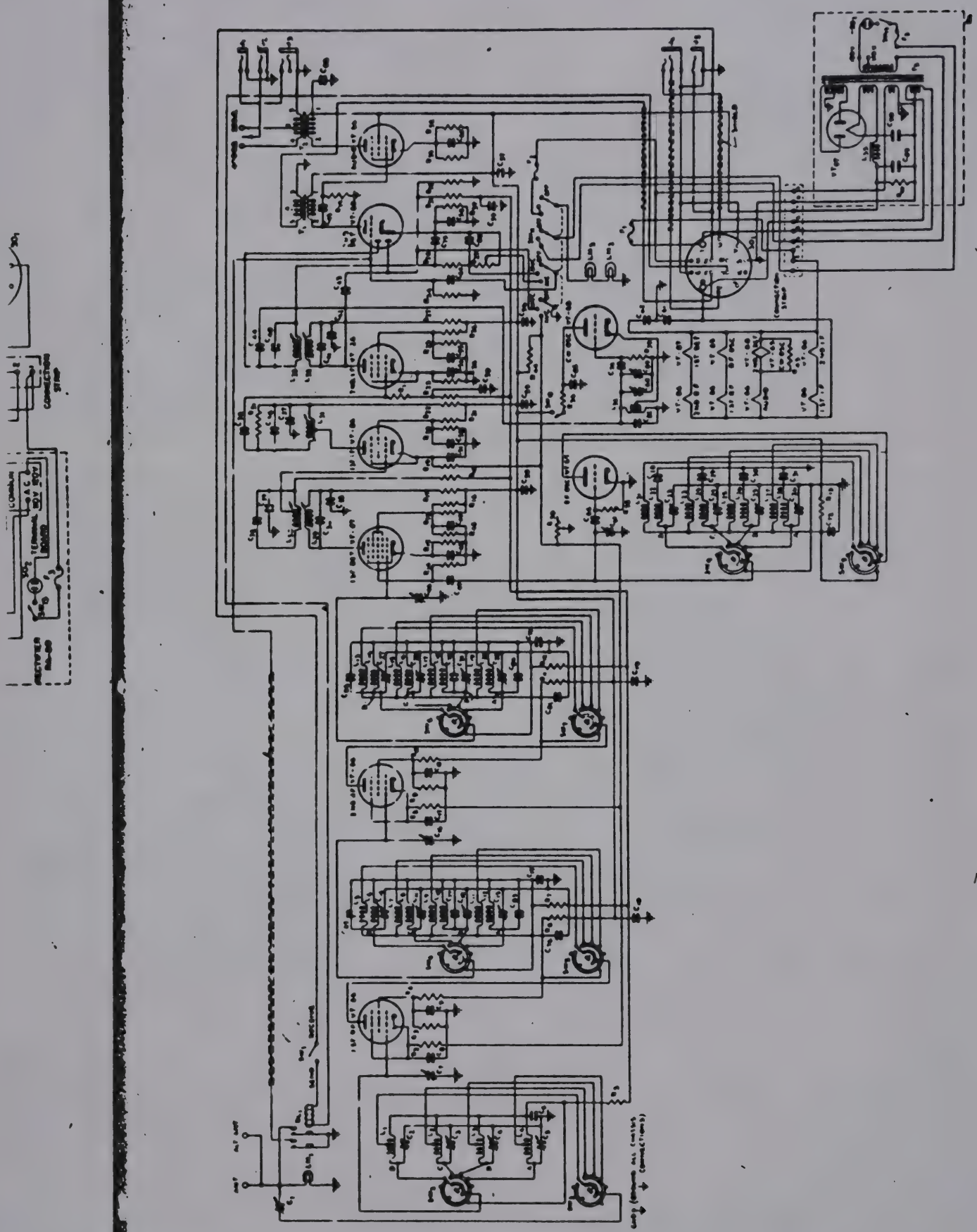


Figure 16.—Schematic diagram, Receiver BC-344-(*).

driver slot in the end of the screw. The capacitor is of the air-padded type composed of a stator and a rotor. The rotor can be rotated through 360 degrees; at the completion of one revolution, the initial capacitance value is repeated. When the receiver is setting in a normal position, the stator plates are located below the center line (screw driver slot). Capacitance is at a minimum when the red dot is above the center line, and at a maximum when the red dot is below the center line.

(3) *Intermediate-frequency markings.*—

Each intermediate-frequency transformer is marked on top of the container with its functional purpose. For Receivers BC-314-(*) and BC-344-(*) the markings are: 1ST DET TRANS and C-292, 1ST IF TRANS and C-293, and 2D IF TRANS and C-294. An adjustment screw is located on the top of each transformer. Adjustment screws on the under side of the chassis are for 1ST DET TRANS and 2D IF TRANS. There is no under side adjustment for the 1ST IF TRANS. For Receivers BC-312-(*)[1], BC-312-(*)X[1] and BC-342-(*) the markings are: 1ST DET TRANS and C-282[1], 1ST IF TRANS and C-283, and 2D IF TRANS and C-284. Each of these transformers has a top and bottom adjustment screw. The 1ST DET TRANS[2] also contains the crystal phasing circuit equipped with a crystal. For all types of receivers, the adjustment screws on the intermediate-frequency transformers vary the position of the iron cores as a means of tuning. Each adjusting screw is locked by means of a lock nut.

f. Alignment frequencies.—

(1) Receivers BC-312-(*), BC-312(*)X, and BC-342-(*) use an intermediate frequency of 470 kc The radio-frequency alignment frequencies for the different bands are:

Band	Alignment Frequency
A	2900 kc
B	4900 kc
C	7850 kc
D	11000 kc
E	13750 kc
F	17700 kc

[1]1st DET TRANS and C-412 in Receivers BC-312-N, and BC-312-NX.
1st DET TRANS and C-422 in Receivers BC-312-L and BC-312-M.
[2]Not on Receivers BC-312-L, BC-312-M, BC-312-N and BC-312-NX.

(2) On bands, A, B, and C the radio-frequency oscillator operates at a frequency 470 kc above the radio-frequency signal being received. For bands D, E, and F the radio-frequency oscillator operates 470 kc below the radio-frequency signal being received.

(3) On bands A, B, and C set the radio-frequency oscillator trimmer capacitors for the minimum capacitance for which the radio-frequency oscillator can be peaked. Set the radio-frequency oscillator trimmer of bands D, E, and F for the maximum capatance for which the radio-frequency oscillator can be peaked. This automatically avoids setting the radio-frequency oscillator at an image frequency.

(4) Receivers BC-314-(*) and BC-344-(*) use an intermediate-frequency of 92.5 kc. The radio-frequency alignment frequencies for the different bands are:

Band	Alignment Frequency
A	255 kc
B	440 kc
C	800 kc
D	1450 kc

(5) In Receivers BC-314-(*) and BC-344-(*), the radio-frequency oscillator operates at a frequency 92.5 kc above the radio-frequency signal being received.

(6) For Receivers BC-314-(*) and BC-344-(*), set the radio-frequency oscillator trimmer capacitors for the minimum capacitance that will peak the oscillator circuit.

(7) If a signal generator capable of generating a frequency of 92.5 kc for the alignment of the i-f of Receivers BC-314-(*) and BC-344-(*) type is not available, a substitute will have to be used. See *g* (4) (*b*) below.

g. Alignment Procedure.—

(1) *General.*—

This alignment procedure applies to Radio Receivers BC-312-(*), BC-312-(*)X, BC-314-(*), BC-342-(*) and BC-344-(*). The following panel control settings are made before the alignment is begun, and are left in these positions unless otherwise stated:

(*a*) Set OFF-MVC-AVC switch to MVC.

(*b*) Set CRYSTAL PHASING control to OUT (if receiver is equipped with crystal).

(*c*) Set CW-OSC OFF-ON switch to OFF (except for CW-OSC alignment.)

(*d*) Set VOL control for maximum output.

(*e*) Plug output meter into PHONES 2D AUDIO.

(2) *Calibration of Test Equipment.*—

Frequency Meter Set SCR-211-(*) can be used to check the frequency and stability of the signal generator used. This is done by coupling (inductively or capacitively - *not* directly) the output of the signal generator to the antenna of the frequency meter. Set the signal generator at the test frequency to be used and adjust the output so that a satisfactory heterodyne note is heard in the phones which are plugged into the frequency meter. When this is accomplished adjust the frequency meter for zero beat with the signal generator. Check the frequency by reading the setting of the frequency meter, and make the necessary readjustments of the signal generator to keep it on frequency (using the frequency meter as the standard).

(3) *Order of Stage Alignment.*—

An over-all receiver alignment is accomplished by adjusting the various stages in the following order:

(*a*) Second intermediate-frequency transformer
(*b*) First intermediate-frequency transformer
(*c*) First detector output transformer
(*d*) Continuous-wave oscillator
(*e*) Crystal filter (when employed in the receiver)
(*f*) Radio-frequency oscillator
(*g*) Grid circuit of the first detector
(*h*) Grid circuit of the preceding radio-frequency stages
(*i*) Antenna alignment capacitors

(4) *Intermediate-frequency Alignment.*—

(*a*) With receiver controls set as instructed in paragraph 39*g* (1) and the signal generator set for the intermediate frequency of the receiver to be aligned, introduce the test signal into the mixer stage by connecting the signal generator output through a 300-

ohm resistor to the grid cap (which remains on the tube) of the mixer Tube VT-87. The ground side of the signal generator output must be connected to the ground connection of the receiver. *Always use the lowest signal generator output for which a good resonance indication can be obtained.* Align the intermediate-frequency transformer and working back toward and including the 1st detector output transformer. Repeat the adjustments by going through this sequence until the i-f circuits are perfectly aligned, as indicated by maximum output meter reading. In the event that some major repairs have been made in the i-f circuits, the latter may be so far out of alignment that this procedure cannot be used. If so move the signal generator connection to the grid cap of the second intermediate-frequency stage, without changing the ground connection. Adjust the intermediate-frequency transformers for maximum response, as indicated by the output meter. If this circuit will not peak at the frequency specified, a check must be made to determine the source of the trouble before the alignment procedure can be continued. Make a circuit continuity test to determine whether or not the i-f transformer concerned is defective. After the 2d i-f stage has been peaked, connect the signal generator output to the grid cap of the 1st i-f tube. Align this stage by proceeding as in the 2d i-f stage. Here again, if the circuit will not peak at the specified frequency, the source of trouble must be located before continuing. Move the signal generator connection to the grid cap of the 1st detector tube. Use the same procedure to align the 1st detector transformer. Go over all the stages again and adjust for maximum output. The i-f amplifier stages then will be aligned, and a 150-microvolt signal from the signal generator should produce an output signal of at least 10 milliwatts, with a noise component of not over 1 milliwatt.

(*b*) If a signal generator which tunes to 92.5 is not available use the following method of i-f alignment of BC-314-(*) and BC-344-(*):

(1) Set FREQUENCY dial of receiver to any frequency of any band, for example — 200 kilocycles.

(2) Plug headset into frequency meter, and insert the end of antenna lead from the frequency meter into the receiver oscillator compartment (open hinged cover) so that its end (no conductors exposed) lies close to the stator plates of the oscillator tuning capacitor section.

(3) Tune frequency meter to 92.5 kc *above* the frequency at which the receiver dial is set for (if 200 kc. 200 + 92.5 or 292.5 kc), then slowly tune the frequency meter dial back and forth, about 15 kc, until a varying beat frequency note is heard in the phones. When zero beat is heard in the phones, cease tuning, and note the point on the frequency meter dial at which zero beat is heard. Consult the frequency meter calibration book for the frequency. If the frequency obtained is not 92.5 kc more than the frequency indicated by the receiver dial, adjust the receiver oscillator trimmer in small steps until a zero beat is heard in the frequency meter headset *exactly* 92.5 kc above the receiver dial setting.

(4) When the oscillator trimmer is finallly adjusted to the desired frequency, tighten the locknut on this adjustment so that it cannot change. Disconnect and turn "off" frequency meter. Do not change receiver dial.

(5) Connect the I-72-(*), through a 250 $\mu\mu f$ capacitor dummy antenna, to the receiver antenna post. Connect the output meter to the receiver's (final) output jack.

(6) Set the dial of the signal generator to the same frequency as that indicated on the receiver dial (200 kc). Use a modulated signal from the signal generator, and align the i-f transformers for peak output in the output meter as described in paragraph 39*g* (4) (*a*) above.

(5) *Adjustment of the Continuous-wave Oscillator.*—

With the i-f circuit properly aligned, the c-w oscillator can be adjusted. Set the CW-OSC OFF-ON switch to ON. Adjust the signal generator for a c-w signal (Modulator turned off). Set the arrow on the CW-OSC AJUST control to the horizontal position. The trimmer capacitor of the continuous-wave oscillator is accessible through a hole in the front panel (located above CW-OSC OFF-ON switch) after the slotted cap plug is removed. Vary this capacitor until a heterodyne note, zero beat, and finally a heterodyne note again are produced. Back up on the trimmer until zero beat is obtained. Rotate the CW-OSC ADJUST control 90 degrees to the right, then back to the horizonal position again, and then 90 degrees to the left. During this rotation the signal should increase in pitch, decrease as the horizontal position is approached, and then rise in pitch again as the control is rotated to the left. Check the adjustment for beats between the continuous

wave oscillator and the radio-frequency oscillator by varying the tuning of the receiver over a wide range of frequencies. The audio note should not change if the continuous-wave oscillator adjustment has been made properly.

(6) *Alignment of the Radio-frequency Oscillator.*—

Check the r-f oscillator alignment with the c-w oscillator turned off and modulation applied to the signal generator (with the signal generator output still connected to the grid of the first detector tube). Adjust the signal generator to the proper frequency for the band being aligned. With the receiver set on the corresponding band, the trimmer capacitor of the r-f oscillator must be adjusted until maximum response is obtained on the output meter. There are two possible adjustments of the trimmer that will produce identical output meter readings. One of these corresponds to the image frequency, while the other is the desired frequency. At this point it is impossible to tell whether the r-f oscillator is above or below the r-f frequency unless it is checked by means of the frequency meter. Such a check will also provide a means of double-checking the intermediate frequency, since this should be the difference between the signal generator reading and the reading of the frequency meter. When the above operations are completed for each of the bands using the specified alignment frequencies, the receiver is ready for alignment of the radio-frequency stages. *The adjustment of the radio-frequency oscillator trimmer capacitors is very critical and the slightest change in position of the trimmers detunes the radio-frequency oscillator circuits.* In the final adjustment, rock the main tuning dial of the receiver back and forth, and note the point of maximum output. If this test results in good centering of the frequency markings behind the hair-line indicator, the trimmer is properly adjusted. If, however, the maximum output is obtained at a different frequency marking than that of the signal generator, repeat the adjustment of the radio-frequency oscillator trimmer until exact frequency agreement is attained.

(7) *Alignment of the Radio-frequency Stages.*—

Remove the flat-head screws and shield plate that cover the r-f amplifier coil trimmers. The signal generator output must be connected to the grid cap of the 2d r-f tube through a 50 $\mu\mu f$ capacitor for all receivers except the BC-314-(*) and BC-344-

(*); for these use a 250 $\mu\mu f$ capacitor. The grid circuit of the 1st detector must be aligned for maximum output. Then connect the signal generator output to the grid cap of the first radio-frequency tube, and align the grid circuit of the 2d radio-frequency stage for maximum output. Leave the caps on the tubes whenever connecting the signal generator to them, and while working on the trimmers for a particular band do not touch the trimmer adjustments of other bands. Proceed with the alignment of one band and work towards the 1st r-f stage grid circuit. Recheck the overall r-f alignment before starting to align another band. Be sure to use low signal generator output.

(8) *Alignment of the Antenna Stage.*—

With the ALIGN INPUT control set in the mid position (arrow pointing up), adjust the trimmer across the grid of the first r-f stage for maximum output. This alignment must be checked over the entire range. Perfect alignment over the entire ranges of bands A and B is not possible in receivers of the BC-312-(*), BC-312-(*)X, and BC-342-(*) types. In these cases, a compromise position of the antenna trimmer must be determined by checking alignment over the band several times, and then choosing the setting at which best results are obtained.

(9) *Crystal Filter Check.*—

When the i-f and r-f circuits are properly aligned, turn the CRYSTAL PHASING control from the OUT position and adjust for minimum background noise. Set the signal generator to an unmodulated signal. Turn the main dial sharply back and forth across the band point for which the receiver is tuned to receive the signal generator output. Under these conditions a musical chirp will be heard. If the chirp is present this indicates that the crystal is being excited by the varying i-f signal produced by the above tuning operation. The effect will be more pronounced for one direction of the main tuning dial than for the other. After a careful alignment, a retrim of the r-f oscillator with the signal generator output introduced into the receiver at the signal antenna, will yield the maximum crystal sensitivity. This adjustment will be very critical for each of the six bands and care must be taken that the previous alignment work is not lost. *Do not touch the radio-frequency or intermediate-frequency amplifier coil trimmers or the main tuning dial during retrimming operations on*

the radio-frequency oscillators. During the retrimming operations the phasing adjustment must not be disturbed. When retrimming operations are complete, set the CRYSTAL PHASING control to OUT, and check the signal sensitivity. There should be no loss in sensitivity.

(10) *Check of Final Alignment.*—

With the receiver aligned, the main tuning control should be varied throughout the band and the alignment checked for at least three different frequency settings in the band. Satisfactory performance will be obtained if the r-f oscillator is following the radio-frequency stages correctly and producing a difference (or beat) frequency equal to the intermediate frequency. In actual practice, absolutely perfect tracking is never obtained. It is essential that the receiver be checked throughout each band, and the circuits so compensated that optimum results are obtained. When a receiver is out of alignment, the radio-frequency oscillator often may be adjusted to the wrong side of the radio-frequency stages, in which case tracking with the receiver and preceding stages is not possible. *Consequently, extreme care must be taken to see that the initial radio-frequency oscillator alignment frequency is on the correct side of the radio-frequency stages so that proper tracking will be possible.* The final check of correct alignment is the sensitivity and selectivity of the receiver, after completion of all test. Receivers BC-312-(*), BC-312-(*)X, and BC-342-(*) will be capable of producing a 10-milliwatt output signal with a signal-to-noise ratio of 4 to 1, with not more than a 5-microvolt input at any frequency in the range of the receiver. Receivers BC-314-(*) and BC-344-(*) will be able to produce a 10-milliwatt signal output with a signal-to-noise ratio of 4 to 1, with not more than a 10-microvolt input at any frequency within the range of the receiver.

h. Special Alignment Procedure for the Crystal Filter.—

Under the alignment conditions described in *g* above, the receiver sensitivity without the use of the crystal is at its maximum. Considerably less sensitivity than that indicated in paragraph 39*g* (10) is obtained when the CRYSTAL PHASING control is set for maximum crystal selectivity. In the event that maximum sensitivity in conjunction with crystal selectivity is required, use the following alignment procedure:

(1) Align the receiver as described in paragraph 39 *g*.

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(2) Set the CRYSTAL PHASING control for minimum background noise.

(3) Vary the signal generator frequency above and below 470 kc by means of the fine frequency control adjustment, so as to bring the signal generator frequency to exact coincidence with the natural frequency of the crystal at the above mentioned setting of the phasing control.

(4) Readjust the top core trimmer screw (located at the top of the 1st detector output transformer) for maximum output.

(5) Repeat the operations of (2) and (3) again. *Do not change the setting of the crystal phasing control during operations indicated in (2), (3), (4) and (5).*

(6) The receiver now will have a considerably higher crystal selectivity and sensitivity than before, but when the crystal operation is removed, sensitivity will be slightly less.

SECTION V
SUPPLEMENTARY DATA

Table of Replaceable Parts ..... Paragraph 40

40. Table of Replaceable Parts.—

a. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*).—

NOTE: Unless otherwise indicated, parts as listed apply to all equipments covered by this manual.

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_1	4	3D289	CAPACITOR CA-289; variable, air, 3-25 $\mu\mu f$, 7 plates, 0.008" minimum spacing between rotor and stator plates, isolantite base, overall length 1-9/32", screwdriver adjustment, special contact spider, plates and wiper contacts silver or nickel plated. (Same as C_7, C_{13}, C_{19}.)	Band A trimmer, 1st r-f	SC-A-1728
C_2	8	3D291	CAPACITOR CA-291; variable, air, 6-100 $\mu\mu f$, 27 plates, 0.008" minimum spacing between rotor and stator plates, isolantite base, overall length 1⅞", screwdriver adjustment, special contact spider, plates and wiper contacts silver or nickel plated, all other parts nickel plated. (Same as C_3, C_8, C_9, C_{14}, C_{15}, C_{20}, C_{21}.)	Band B trimmer, 1st r-f	SC-A-1728
C_3	—	—	CAPACITOR CA-291; (Same as C_2.)	Band C trimmer, 1st r-f	—

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_4	12	3D290	CAPACITOR CA-290; variable, air, 4-50 $\mu\mu f$, 14 plates, 0.008" minimum spacing between rotor and stator plates, isolantite base, overall length 1½", screwdriver adjustment, special contact spider, plates and wiper contacts silver or nickel plated, all other parts nickel plated. (Same as C_5, C_6, C_{10}, C_{11}, C_{12}, C_{16}, C_{17}, C_{18}, C_{22}, C_{23}, C_{24}.)	Band D trimmer, 1st r-f	SC-A-1728
C_5	—	—	CAPACITOR CA-290; (Same as C_4.)	Band E trimmer, 1st r-f	—
C_6	—	—	CAPACITOR CA-290; (Same as C_4.)	Band F trimmer, 1st r-f	—
C_7	—	—	CAPACITOR CA-289; (Same as C_1.)	Band A trimmer, 2d r-f	—
C_8	—	—	CAPACITOR CA-291; (Same as C_2.)	Band B trimmer, 2d r-f	—
C_9	—	—	CAPACITOR CA-291; (Same as C_2.)	Band C trimmer, 2d r-f	—
C_{10}	—	—	CAPACITOR CA-290; (Same as C_4.)	Band D trimmer, 2d r-f	—
C_{11}	—	—	CAPACITOR CA-290; (Same as C_4.) (Except BC-312-J, L, M and BC-342-J, L, M.) CAPACITOR CA-291; (Same as C_1.) (Used in BC-312-J, L, M and BC-342-J, L, M only.)	Band E trimmer, 2d r-f	—
C_{12}	—	—	CAPACITOR CA-290; (Same as C_4.)	Band F trimmer, 2d r-f	—
C_{13}	—	—	CAPACITOR CA-289; (Same as C_1.)	Band A trimmer, 1st detector	—
C_{14}	—	—	CAPACITOR CA-291; (Same as C_2.)	Band B trimmer, 1st detector	—

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{15}	—	—	CAPACITOR CA-291; (Same as C_2.)	Band C trimmer, 1st detector	—
C_{16}	—	—	CAPACITOR CA-290; (Same as C_4.)	Band D trimmer, 1st detector	—
C_{17}	—	—	CAPACITOR CA-290; (Same as C_4.)	Band E trimmer, 1st detector	—
C_{18}	—	—	CAPACITOR CA-290; (Same as C_4.)	Band F trimmer, 1st detector	—
C_{19}	—	—	CAPACITOR CA-289; (Same as C_1.)	Band A trimmer, r-f oscillator	—
C_{20}	—	—	CAPACITOR CA-291; (Same as C_2.)	Band B trimmer, r-f oscillator	—
C_{21}	—	—	CAPACITOR CA-291; (Same as C_2.)	Band C trimmer, r-f oscillator	—
C_{22}	—	—	CAPACITOR CA-290; (Same as C_4.)	Band D trimmer, r-f oscillator	—
C_{23}	—	—	CAPACITOR CA-290; (Same as C_4.)	Band E trimmer, r-f oscillator	—
C_{24}	—	—	CAPACITOR CA-290; (Same as C_4.)	Band F trimmer, r-f oscillator	—
C_{25}	4	3D294	CAPACITOR CA-294; fixed, 125 $\mu\mu f$ ±1 $\mu\mu f$, silver mica. Assembly consists of: 4 brass studs, 2 brass bushings, 4 terminals, 4 brass eyelets and fixed capacitor mounted on ceramic or bakelite base, 1⅛" x ⅞" x ⅛". (Same as C_{38}, C_{40}, C_{100}.)	1st r-f padder	SC-D-2575

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{26}	1	3D293	CAPACITOR CA-293; variable, air, 10-210 $\mu\mu$f, isolantite base, overall length 3-9/16" x 1-9/32" high, plates, studs and shaft silver plated.	Antenna alignment	SC-D-2580
C_{27}	7	3D284	CAPACITOR CA-284; fixed, 0.05 μf ±10%, 400 v. d.c. working, paper, pigtail leads. (Same as C_{32}, C_{39}, C_{62}, C_{87}, C_{99}, C_{102}.)	1st r-f bypass	SC-D-1995
—	1	3D292	CAPACITOR CA-292; variable, air, 13-226 $\mu\mu$f, 4 sections. (C_{28}, C_{34}, C_{46}, C_{82}.)	Tuning gang	SC-D-2568
C_{28}	—	—	One section of CA-292; (See preceding item).	1st r-f tuning	—
—	3	3D195	CAPACITOR CA-195; fixed, 3 section, each 0.05 μf +14% —6%, 300 v. d.c. working, paper, oil impregnated, 3 terminals, sealed in metal case 1.738" long x 1-1/16" high x 9/16" wide, 2.125" between centers of mounting brackets. (C_{29}, C_{30}, C_{31}, C_{35}, C_{36}, C_{37}, C_{48}, C_{49}, C_{50}.)		SC-D-512
C_{29}	—	—	One section of CA-195: (See preceding item).	1st r-f cathode bypass	—
C_{30}	—	—	One section of CA-195; (Same as C_{29}.)	1st r-f screen bypass	—
C_{31}	—	—	One section of CA-195; (Same as C_{29}.)	1st r-f "B" supply bypass	—
C_{32}	—	—	CAPACITOR CA-284; (Same as C_{27}.)	1st r-f plate bypass	—

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{33}	6	3D266	CAPACITOR CA-266; fixed, 100 $\mu\mu$f +14% —6%, 250 v. d.c. working, mica, pigtail leads. (Same as C_{45}, C_{47}, C_{86}, C_{101}.)	2d r-f grid coupling	SC-D-1993
C_{34}	—	—	One section of CA-292; (Same as C_{28}.)	2d r-f tuning	—
C_{35}	—	—	One section of CA-195; (Same as C_{29}.)	2d r-f cathode bypass	—
C_{36}	—	—	One section of CA-195; (Same as C_{29}.)	2d r-f screen bypass	—
C_{37}	—	—	One section of CA-195; (Same as C_{29}.)	2d r-f "B" supply bypass	—
C_{38}	—	—	CAPACITOR CA-294; (Same as C_{25}.)	1st detector padder	—
C_{39}	—	—	CAPACITOR CA-284; (Same as C_{27}.)	2d r-f plate bypass	—
C_{40}	—	—	CAPACITOR CA-294; (Same as C_{25}.)	R-f oscillator padder	—
C_{41}	1	3D278	CAPACITOR CA-278; fixed, 5 $\mu\mu$f +14% — 6%, 300 v. d.c. working, mica, pigtail leads. (Use to replace 5 $\mu\mu$f Erie type NPO-K in BC-312-L, M.)	C-w oscillator coupling	SC-D-1993
C_{42}	1	3D300	CAPACITOR CA-300; fixed, 3000 $\mu\mu$f ±2%, 250 v. d.c. working, silver mica, pigtail leads.	Band C padder, r-f oscillator	SC-D-1993
C_{43}	1	3D297	CAPACITOR CA-297; fixed, 1600 $\mu\mu$f ±2%, 250 v. d.c. working, silver mica, pigtail leads.	Band B padder, r-f oscillator	SC-D-1993
C_{44}	1	3D299	CAPACITOR CA-299; fixed, 750 $\mu\mu$f ±2%, 250 v. d.c. working, silver mica, pigtail leads.	Band A padder, r-f oscillator	SC-D-1993
C_{45}	—	—	CAPACITOR CA-266; (Same as C_{33}.)	1st detector grid coupling	—
C_{46}	—	—	One section of CA-292; (Same as C_{28}.)	1st detector tuning	—
C_{47}	—	—	CAPACITOR CA-266; (Same as C_{33}.)	R-f oscillator coupling	—

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{48}	—	—	One section of CA-195; (Same as C_{29}.)	1st detector cathode bypass	—
C_{49}	—	—	One section of CA-195; (Same as C_{29}.)	1st detector screen bypass	—
C_{50}	—	—	One section of CA-195; (Same as C_{29}.)	1st detector "B" supply bypass	—
C_{51}	1	3D323	CAPACITOR CA-323; variable, air, 4-50 μμf, (Except BC-312-L, M, N, NX.)	Crystal phasing	SC-A-1728
C_{52}	1	3D342	CAPACITOR CA-342; fixed, 100 μμf ±2%, 400 v. d.c. working, mica. (Not used in BC-312, BC-312-A, L, M, N, NX, BC-342.)	1st i-f grid coupling	SC-D-1993
		3D266	CAPACITOR CA-266; fixed, 100 μμf + 14% —6%, 250 v. d.c. working, mica, ¾" x ¾" x 3/16". (Used in BC-312, BC-312-A and BC-342 only.)		
C_{53}	—	†	CAPACITOR CA-344; fixed, 400 μμf ±2%, 400 v. d.c. working, silver mica, pigtail leads. (Same as C_{55}, C_{57}.) (Except BC-312, BC-312-A, BC-342.)	1st detector transformer primary tuning	SC-D-1993
		†	CAPACITOR CA-296; fixed, 400 μμf ±2%, 250 v. d.c. working, mica, ⅞" x ⅞" x ⅜". (Used in BC-312, BC-312-A and BC-342 only.)		

†Part of an assembly, not a replaceable part.

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC 342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{54}	—	†	CAPACITOR CA-371; fixed, 0.01 μf ±10%, 450 v. d.c. working, mica, 1¼" between centers of mounting holes. (Same as C_{56}, C_{58}, C_{63}, C_{66}, C_{78}.) (Except BC-312, BC-312-A, N, NX, BC-342, BC-342-N.)	1st detector plate bypass	RL-D-6222
		†	CAPACITOR CA-281; fixed, 0.01 μf ±10%, 400 v. d.c. working, paper. (Used in BC-312, BC-312-A, N, NX, BC-342, BC-342-N only.)	1st detector plate bypass	SC-D-1995
C_{55}	—	†	CAPACITOR CA-344; (Same as C_{53}.) (Except BC-312, BC-312-A, BC-342.)	1st i-f transformer secondary tuning	—
		†	CAPACITOR CA-295; fixed, 50 μμf ±2%, 300 v. d.c. working, mica, ½" x ⅜" x ¼". (Used in BC-312, BC-312-A, BC-342 only.		
C_{56}	—	†	CAPACITOR CA-371; (Same as C_{54}.) (Except BC-312, BC-312-A, N, NX, BC-342, BC-342-N.)	2d i-f AVC bypass	—
		†	CAPACITOR CA-281; (Same as C_{54}.) (Used in BC-312, BC-312-A, N, NX, BC-342, BC-342-N only.)		

†Part of an assembly, not a replaceable part.

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{57}	—	†	CAPACITOR CA-344; (Same as C_{53}.) (Except BC-312, BC-312-A, BC-342.)	1st i-f transformer primary tuning	—
		†	CAPACITOR CA-295; (Same as C_{55}.) (Used in BC-312, BC-312-A, BC-342 only.)		
C_{58}	—	†	CAPACITOR CA-371; (Same as C_{54}.) (Except BC-312, BC-312-A, NX, BC-342.) (Replaces CA-281 in all models.)	1st i-f plate bypass	—
		†	CAPACITOR CA-281; (Same as C_{54}.) (Used in BC-312, BC-312-A, NX, BC-342.)		
—	1	3D302	CAPACITOR CA-302; fixed, 3 sections, each 0.05 μf +14%—6%, 300 v. d.c. working, paper, oil impregnated, 3 terminals, sealed in metal case, 1.738" long x 1-1/16" high x 9/16" wide, one mounting bracket at side, other bracket at front (C_{59}, C_{60}, C_{61}.)	—	SC-D-2567
C_{59}	—	—	One section of CA-302; (See preceding item)	1st i-f cathode bypass	—
C_{60}	—	—	One section of CA-302; (Same as C_{59}.)	1st i-f screen bypass	—
C_{61}	—	—	One section of CA-302; (Same as C_{59}.)	1st i-f "B" supply bypass	—
C_{62}	—	—	CAPACITOR CA-284; (Same as C_{27}.)	1st detector AVC bypass	—

†Part of an assembly, not a replaceable part.

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{63}	—	†	CAPACITOR CA-371; (Same as C_{54}.) (Except BC-312, BC-312-A, N, NX, BC-342, BC-342-N.)	1st i-f AVC bypass	—
		†	CAPACITOR CA-281; (Same as C_{54}.) (Used in BC-312, BC-312-A, N, NX, BC-342-N only.)		
		†	CAPACITOR CA-296; (Same as C_{53}.) (Used in BC-342 only.)		
C_{64}	—	†	CAPACITOR CA-342; fixed, 100 μμf ±2%, 400 v. d.c. working, silver mica, pigtail leads. (Except BC-312, BC-342.)	2d i-f transformer secondary tuning	SC-D-1993
		†	CAPACITOR CA-295; (Same as C_{55}.) (Used in BC-312, BC-342 only.)		
C_{65}	—	†	CAPACITOR CA-342; (Same as C_{64}.) (Except BC-312, BC-342.)	2d i-f transformer primary tuning	—
		†	CAPACITOR CA-295; (Same as C_{55}.) (Used in BC-312, BC-342 only.)		
C_{66}	—	†	CAPACITOR CA-371; (Same as C_{54}.) (Except BC-312, BC-312-A, N, NX, BC-342 and BC-342-N.)	2d i-f plate bypass	—
		†	CAPACITOR CA-281; (Same as C_{54}.) (Used in BC-312, BC-312-A, N, NX, and BC-342-N.)		
		†	CAPACITOR CA-296; (Same as C_{53}.) (Used BC-342 only.)		

†Part of an assembly, not a replaceable part.

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{67}	1	3D279	CAPACITOR CA-279; fixed, 10 μμf +14%—6%, 400 v. d.c. working, mica, pigtail terminals. (Use to replace 10 μμf Erie type NPO-K in BC-312-L, M.)	Diode AVC coupling	SC-D-1993
—	2	3D301	CAPACITOR CA-301; fixed, 3 sections, each 0.05 μf +14%—6%, 300 v. d.c. working, paper, oil impregnated, 3 terminals, sealed in metal case, 1.738" long x 9/16" wide x 1-1/16" high, mounting brackets at right angles. (C_{68}, C_{69}, C_{70}, C_{73}, C_{74}, C_{75}.)	—	SC-D-2567
C_{68}	—	—	One section of CA-301; (See preceding item.)	2d i-f cathode bypass	—
C_{69}	—	—	One section of CA-301; (Same as C_{68}.)	2d i-f screen bypass	—
C_{70}	—	—	One section of CA-301; (Same as C_{68}.)	2d i-f plate supply bypass	—
C_{71}	1	3D218	CAPACITOR CA-218; fixed, 150 μμf +14%—6%, 250 v. d.c. working, mica, closed type terminals.	2d detector output filter	SC-D-1993
C_{72}	1	3D193	CAPACITOR CA-193; fixed, 500 μμf +14%—6%, 250 v. d.c. working, mica, closed type terminals.		
C_{73}	—	—	One section of CA-301; (Same as C_{68}.)	2d detector cathode bypass	
C_{74}	—	—	One section of CA-301; (Same as C_{68}.)	1st audio "B" supply bypass	
C_{75}	—	—	One section of CA-301; (Same as C_{68}.)	AVC filter	

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{76}	—	—	CAPACITOR CA-371; (Same as C_{54}.) (Except BC-312, BC-312-A, BC-342.) (Replaces CA-281 in all models.)	2d audio grid coupling	—
		—	CAPACITOR CA-281; (Same as C_{54}.) (Used in BC-312, BC-312-A only.)		
		—	CAPACITOR CA-296; (Same as C_{53}.) (Used in BC-342 only.)		
—	1	3D276	CAPACITOR CA-276; fixed, 3 sections, each 0.1 μf +14% —6%, 400 v. d.c. working, paper, oil impregnated, 3 terminals, sealed in metal case, 1-27/32" long x 1" high x 13/16" wide, 2⅛" between centers of mounting brackets. (C_{78}, C_{79}, C_{80}.)	—	SC-D-512
C_{78}	—	—	One section of CA-276; (See preceding item.)	—"A" supply bypass	—
C_{79}	—	—	One section of CA-276; (Same as C_{78}.)	+"A" supply bypass	—
C_{80}	—	—	One section of CA-276; (Same as C_{78}.)	2d audio "B" supply bypass	—
C_{81}	—	—	CAPACITOR CA-281; (Same as C_{54}.)	1st audio grid coupling	—
C_{82}	—	—	One section of CA-292; (Same as C_{28}.)	R-f oscillator tuning	—
C_{83}	1	3D277	CAPACITOR CA-277; fixed, 0.1 μf ±10%, 400 v. d.c. working, paper, pigtail leads.	R-f oscillator plate bypass	SC-D-1995

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{84}	1	3D280 3D383	CAPACITOR CA-280; variable, air, 10 $\mu\mu$f. (Used in BC-312, BC-312-A, C, BC-342-C only.) CAPACITOR CA-383; variable, air, 1-10 $\mu\mu$f, 0.008" minimum spacing between rotor and stator plates, assembly 1-11/16" long, special spider plate, shaft and studs all silver or nickel plated. (Except BC-312, BC-312-A, C and BC-342-C.)	C-w oscillator control	SC-A-1728
C_{85}	1	3D253	CAPACITOR CA-253; variable, air, 4-75 $\mu\mu$f, 20 plates, 0.008" minimum spacing between stator and rotor plates, overall length 1-15/32", screwdriver adjustment, special contact spider, plates and wiper contacts silver or nickel plated, all other parts nickel plated.	C-w oscillator trimmer	SC-A-1728
C_{86}	—	—	CAPACITOR CA-266; (Same as C_{33}.)	C-w oscillator grid coupling	—
C_{87}	—	—	CAPACITOR CA-284; (Same as C_{27}.)	C-w oscillator plate bypass	—
C_{88}	—	—	CAPACITOR CA-266; (Same as C_{33}.)	R-f oscillator grid coupling	—

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{89}	2	3D211	CAPACITOR CA-211; fixed, 0.002 μf, 250 v. d.c. working, 7/8" x 7/8" x 5/16". (Used in BC-312, BC-312-A and BC-342 only.)	Thermostat contact bypass	SC-D-1993
C_{90}	—	—	CAPACITOR CA-211; (Same as C_{89}.) (Used in BC-312, BC-312-A and BC-342 only.)		
—	1	3D329	CAPACITOR CA-329; electrolytic, 2 sections, each 8 μf, 450 v. d.c. working, capable of withstanding continuous operation at 85° C. (C_{89}, C_{90}.)	—	SC-A-1490
C_{89}	—	—	One section of CA-329; (See preceding item.) (Used in BC-342-C, D, F, J, L, M, N only.)	"B" power supply filter	—
C_{90}	—	—	One section of CA-329; (Same as C_{89}.) (Used in BC-342-C, D, F, J, L, M, N only.)		
C_{91}		†	CAPACITOR CA-295; (Same as C_{55}.) (Used in BC-312, BC-312-A, BC-342 only.)	1st i-f transformer primary tuning	
C_{92}		†	CAPACITOR CA-295; (Same as C_{55}.) (Used in BC-312, BC-312-A, BC-342 only.)	2d i-f transformer secondary tuning	
C_{93}		†	CAPACITOR CA-295; (Same as C_{55}.) (Used in BC-312, BC-312-A, BC-342 only.)	2d i-f transformer primary tuning	
C_{94}	—	†	CAPACITOR CA-298; fixed, 800 $\mu\mu$f ±2%, 250 v. d.c. working, silver mica, pigtail leads. (Except BC-312-N, NX.)	1st detector transformer tuning	SC-D-1993
C_{95}	—	†	CAPACITOR CA-298; (Same as C_{94}.) (Except BC-312-N, NX.)		

†Part of an assembly, not a replaceable part.

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{96}	2	3D286	CAPACITOR CA-286; fixed, 75 μμf +14% —6%, 250 v. d.c. working, pigtail leads.	C-w oscillator output filter	SC-D-1993
C_{97}	—	—	CAPACITOR CA-286; (Same as C_{96}.)		
C_{98}	1	3D275	CAPACITOR CA-275; fixed, 4 μf +14% —6%, 50 v. d.c. working, 2 terminals, sealed in metal case, 2" long x 2" high x 1" wide, 2⅜" between centers of mounting brackets.	2d audio cathode bypass	SC-D-512
C_{99}	—	—	CAPACITOR CA-284; (Same as C_{27}.)	2d r-f AVC bypass	—
C_{100}	—	—	CAPACITOR CA-294; (Same as C_{25}.)	2d r-f padder	—
C_{101}	—	—	CAPACITOR CA-266; (Same as C_{33}.)	1st r-f grid coupling	—
C_{102}	—	—	CAPACITOR CA-284; (Same as C_{27}.)	1st r-f AVC bypass	—
C_{103}	—	—	CAPACITOR CA-344; (Same as C_{53}.) (Used in BC-312-N, NX only.)	1st detector transformer tuning	—
CX	1	2Z3501-6A	CRYSTAL DC-6-A; quartz, 470 kc. (Except BC-312, BC-312-A, L, M, N, NX, BC-342.)	Crystal filter	SC-D-2972
		2Z3501-6	CRYSTAL DC-6; quartz, 470 kc. (Used in BC-312, BC-312-A, BC-342 only.)	Crystal filter	SC-A-1994
DM	1	3H1621-( )	DYNAMOTOR DM-21-(*); 225 v. d.c. output at 90 ma, 12-14 v. d.c. input, 50° C rise, enclosed in metal case 5-15/16" long x 5-7/16" wide x 3⅛" deep. (Not used in BC-342-(*).) (DM-21-(*) may be used to replace DM-17-A in BC-312 by requisitioning Bracket Set, Stock No. 2C4312/B50.)	Plate power supply	SC-D-2723

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd) —

Order replacement parts by stock number, name and description, and receiver model.

No. Ref.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
F_1	2	3Z1921A	FUSE FU-21-A; cartridge type, 10 amperes, 25 volts, 1¼" long x ¼" dia. (Except BC-312(*)X.)	Dynamotor and filament circuit	
F_2	—	—	FUSE FU-21-A; (Same as F_1.)	Dial light circuit	
F_3	1	3Z1927	FUSE FU-27; cartridge type, 2 amperes, 250 volts, 1¼" long x ¼" dia. (Except BC-312-(*) and BC-342.)	A-c line	
F_4	2	3Z1925A	FUSE FU-25-A; 5 amperes, 25 volts, 1¼" long x ¼" dia. (Used in BC-312-(*)X only.)	Dynamotor and filament circuit	
F_5	—	—	FUSE FU-25-A; (Same as F_4.)	Dial light circuit	
FL	1	3Z1890-6( )	FILTER FL-6-(*); contains chokes and capacitors, sealed in metal case 2" high x 1½" wide x 5" long, 5-3/16" between mounting centers.	Dynamotor filter unit	SC-D-1866
J_1	3	2Z5534A	JACK JK-34-A; open circuit for ⅛" panel max, brass sleeve threaded ⅜-32, complete with phenolic ring, washer, locating plate, brass washers, nut, pin. Beryllium contact, cadmium plated.	§1st audio phone jack	SC-D-2339
J_2	—	—	JACK JK-34-A; (Same as J_1.)	2d audio phone jack	—
J_3	2	2Z5533A	JACK JK-33-A; 3 circuit, for ⅛" panel max, brass sleeve threaded ⅜-32, complete with brass nut, pin, washer, terminal, phenolic washer ring, locating plate. 2 beryllium copper contacts, cadimum plated.	Speaker jack	SC-D-2332

§2d audio in BC-312-NX, L, M, N and BC-342-L, M, N.

Par. 40 *a.* Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
J_4	—	—	JACK JK-33-A; (Same as J_3.)	Microphone jack	—
J_5	—	—	JACK JK-34-A; (Same as J_1.)	Key jack	—
—	1	2C4342N/A2	First r-f unit assembly consisting of: CAPACITORS: CA-289, (3) CA-290, (2) CA-291, CA-294; 2 switches, 6 coils and terminal board assembly, overall assembly mounted in aluminum box. (Used in BC-312-F, HX, N, NX, BC-342-F, N.)	1st r-f tuning unit	SC-D-2553 Farn., 2538-37
—		2C4312M.1/T2	First r-f unit assembly consisting of: CAPACITORS: CA-289, (3) CA-290, (2) CA-291, CA-294; 2 switches, 6 coils and terminal board assembly, overall assembly mounted in aluminum box 4.937" x 5.390" x 2.061". (Used in BC-312-J, L, M, BC-342-J, L, M, only.)	1st r-f tuning unit	RCA, T-621254-502
‡L_1	1	3C1083	COIL	1st r-f, Band A	
‡L_2	1	3C1083-3	COIL	1st r-f, Band B	
‡L_3	1	3C1083-6	COIL	1st r-f, Band C	
‡L_4	1	3C1083-9	COIL	1st r-f, Band D	
‡L_5	1	3C1083-12	COIL	1st r-f, Band E	
‡L_6	1	3C1083-15	COIL	1st r-f, Band F	

‡BC-312-A uses coils made in accordance with RCA dwg. KX-289494.
‡BC-312-C uses coils made in accordance with RCA dwg. KX380082 or TX-262208.
‡BC-312-D uses coils made in accordance with RCA dwg. T-620350 except that oscillator coils are made in accordance with RCA dwg. TX-262208.
‡For BC-312-F, HX, N and NX and BC-342-F and N use Farnsworth dwg. 2556.
‡For BC-312-J, L, M and BC-342-J, L, M use RCA dwg. TX-262208 and T-620350.

Par. 40 *a.* Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
—	1	2C4342N/A3	Second r-f unit assembly consisting of: CAPACITORS: CA-289, (3) CA-290, (2) CA-291, CA-294; 2 switches, 6 coils and terminal board assembly, overall assembly mounted in aluminum box. (Used in BC-312-F, HX, N, NX, BC-342-F, N.)	2d r-f tuning unit	SC-D-2553 Farn., 2538-38
—		2C4312M.1/T3	Second r-f unit assembly consisting of: CAPACITORS: CA-289, (3) CA-290, (2) CA-291, CA-294; 2 switches, 6 coils and terminal board assembly, overall assembly mounted in aluminum box 4.937" x 5.390" x 2.061". (Used in BC-312-J, L, M, BC-342-J, L, M only.)	2d r-f tuning unit	RCA, T-621254-503
‡L_7	1	3C1083-1	COIL	2d r-f, Band A	
‡L_8	1	3C1083-4	COIL	2d r-f, Band B	
‡L_9	1	3C1083-7	COIL	2d r-f, Band C	
‡L_{10}	1	3C1083-10	COIL	2d r-f, Band D	
‡L_{11}	1	3C1083-13	COIL	2d r-f, Band E	
‡L_{12}	1	3C1083-16	COIL	2d r-f, Band F	

‡BC-312-A uses coils made in accordance with RCA dwg. KX-289494.
‡BC-312-C uses coils made in accordance with RCA dwg. KX380082 or TX-262208.
‡BC-312-D uses coils made in accordance with RCA dwg. T-620350 except that oscillator coils are made in accordance with RCA dwg. TX-262208.
‡For BC-312-F, HX, N and NX and BC-342-F and N use Farnsworth dwg. 2556.
‡For BC-312-J, L, M and BC-342-J, L, M use RCA dwg. TX-262208 and T-620350.

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
—	1	2C4342N/A1	First detector unit assembly consisting of: CAPACITORS: CA-289, (3) CA-290, (2) CA-291, CA-294; 2 switches, 6 coils and terminal board assembly, overall assembly mounted in aluminum box. (Used in BC-312-F, HX, N, NX, BC-342-F, N.)	1st detector tuning unit	SC-D-2538 Farn., 2538-36
—		2C4312M.1/T4	First detector unit assembly consisting of: CAPACITORS: CA-289, (3) CA-290, (2) CA-291, CA-294; 2 switches, 6 coils and terminal board assembly, overall assembly mounted in aluminum box 4.937" x 5.390" x 2.061". (Used in BC-312-J, L, M, BC-342-J, L, M only.)	1st detector tuning unit	RCA, T-621254-504
‡L_{13}	1	3C390	COIL	1st detector, Band A	
‡L_{14}	1	3C390-1	COIL	1st detector, Band B	
‡L_{15}	1	3C390-2	COIL	1st detector, Band C	
‡L_{16}	1	3C390-3	COIL	1st detector, Band D	
‡L_{17}	1	3C390-4	COIL	1st detector, Band E	
‡L_{18}	1	3C390-5	COIL	1st detector, Band F	

‡BC-312-A uses coils made in accordance with RCA dwg. KX-289494.
‡BC-312-C uses coils made in accordance with RCA dwg. KX380082 or TX-262208.
‡BC-312-D uses coils made in accordance with RCA dwg. T-620350 except that oscillator coils are made in accordance with RCA dwg. TX-262208.
‡For BC-312-F, HX, N and NX and BC-342-F and N use Farnsworth dwg. 2556.
‡For BC-312-J, L, M and BC-342-J, L, M use RCA dwg. TX-262208 and T-620350.

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
—	1	2C4342N/A4	R-f oscillator unit assembly consisting of: CAPACITORS: CA-289, (3) CA-290, (2) CA-291; 2 switches, 2 terminal board assemblies and 6 coils, overall assembly mounted in aluminum box. (Used in BC-312-F, HX, N, NX, BC-342-F, N.)	R-f oscillator tuning unit	SC-D-2558 Farn., 2538-39
—		2C4312M.1/T5	R-f oscillator unit assembly consisting of: CAPACITORS: CA-289, (3) CA-290, (2) CA-291; 2 switches, 2 terminal board assemblies and 6 coils, overall assembly mounted in aluminum alloy box 5-13/32" x 4-9/16" x 2-1/16". (Used in BC-312-L, M, BC-342-L, M only.)	R-f oscillator tuning unit	RCA, T-621264-501
‡L_{19}	1	3C1083-2	COIL	R-f oscillator, Band A	
‡L_{20}	1	3C1083-5	COIL	R-f oscillator, Band B	
‡L_{21}	1	3C1083-8	COIL	R-f oscillator, Band C	
‡L_{22}	1	3C1083-11	COIL	R-f oscillator, Band D	
‡L_{23}	1	3C1083-14	COIL	R-f oscillator, Band E	
‡L_{24}	1	3C1083-17	COIL	R-f oscillator, Band F	

‡BC-312-A uses coils made in accordance with RCA dwg. KX-289494.
‡BC-312-C uses coils made in accordance with RCA dwg. KX380082 or TX-262208.
‡BC-312-D uses coils made in accordance with RCA dwg. T-620350 except that oscillator coils are made in accordance with RCA dwg. TX-262208.
‡For BC-312-F, HX, N and NX and BC-342-F and N use Farnsworth dwg. 2556.
‡For BC-312-J, L, M and BC-342-J, L, M use RCA dwg. TX-262208 and T-620350.

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
L_{25}, L_{26}, L_{27}		2Z6845	NOISE SUPPRESSOR ASSEMBLY. (BC-312, BC-312-A, C, BC-342, BC-342-C only.)	Antenna noise suppression circuit	
L_{28}	1	2Z9882.1	TRANSFORMER C-282; i-f, 470 kc, adjustable iron cores, coils 7-42 SSE Litz wire on ½" dia. phenolic tube, crystal filter circuit components incorporated, aluminum shield can. (Used in BC-312-C, D, E, F, G, HX, and BC-342-(*)) (Use to replace C-202 in BC-312, BC-312-A, BC-342.)	1st detector transformer	SC-D-4166 Farn., C-282
	1	2Z9940-412	TRANSFORMER C-412; i-f, 470 kc, adjustable iron cores, coil and stud assembly. Includes (2) CA-298, CA-344, (2) CA-281, RS-125, RS-172, RS-175 and 2 terminal boards. (Used in BC-312-N, NX only.)	1st detector transformer	Farn., C-412
	1	2Z9947-422	TRANSFORMER C-422; i-f, 470 kc, adjustable iron cores, top and bottom plate assemblies, coil and stud assembly. Includes (2) CA- 298, CA-344, (2) CA-371, RS-125, RS-172, RS-175 and 3 terminal boards. (Used in BC-312-J, L. M only.)	1st detector transformer	RCA, P-721283-501

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

No. Ref.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
L_{29}	1	2Z9883	TRANSFORMER C-283; i-f, 470 kc, adjustable iron cores, interstage, coil and stud assembly. Includes (2) CA-344, (2) CA-371, RS- 169. (Use to replace C-203 in BC-312, BC-312-A, BC-342.)	1st i-f transformer	SC-D-4166 SC-D-2566 RCA, TX-261944-505 Farn., C-283
L_{30}	1	2Z9884	TRANSFORMER C-284; i-f, 470 kc, adjustable iron cores, diode, coil and core assembly. Includes (2) CA-342, CA-371. (Use to replace C-204 in BC-312, BC-312-A, BC-342.)	1st i-f transformer	SC-D-4166 SC-D-2566 RCA, TX-261944-506 Farn., C-284
L_{31}	1	2C2775/2	COIL; assembly consisting of: coil core, iron core, ⅜" dia., ½" long, 0.136" dia. hole drilled through; coil, 206 turns 7-42 SSE Litz wire, total inductance 1.08 mh ±2% at 1000 cycles (with core), tapped at 0.62 mh, d-c resistance 7 ohms, ¼" x 11/16" dia.	C-w beat oscillator coil	SC-D-2563-15 Farn., 98-1345
L_{32}	1	2C2775/3	COIL; assembly consisting of: coil core, phenolic rod, ⅜" dia., 1¾" long, one end tapped #4-40 x 5/16" deep, 2 cross holes tapped #3-48 x 3/16" deep, one cross hole drilled through 0.104"; coil, 725 turns #36 AWG SSE wire, 6.7 mh ±2% at 1000 cycles (with core), d-c resistance 52 ohms, ⅜" x ¾" dia.	C-w osc filter	SC-D-2563-14 Farn., 98-1343

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps. Drawing No.
L_{35}	1	3C227	COIL C-227; 14.5 henry choke coil. (BC-342-(*) only.)	Rectifier filter choke	SC-D-1489
LM_1	1	2Z5893	LAMP; neon, assembly.	Antenna circuit over-voltage protection	SC-A-1801
LM_2, LM_3	2	2Z5927	LAMP LM-27; minature bayonet base, 6.3 v., 0.25 a. G. E. type 44 (Except BC-312-(*)X.)	Dial illumination	SC-D-2573
LM_4, LM_5	2	2Z5942	LAMP LM-42; minature bayonet base, 18 v., 0.15 a., G. E. type 47. (Used in BC-312-(*) X only.)	Dial illumination	
R_1	4	3Z4564	RESISTOR RS-164; fixed, wire-wound, insulated, 500 ohm, ±10%, 1 watt, 1" x ⅜" x ⅛", pigtail leads. (Same as R_7, R_{19}, R_{24}.)	1st r-f cathode bias	SC-D-970
R_2	4	3Z4569	RESISTOR RS-169; fixed, composition, insulated, 60,000 ohm, ±10%, ½ watt, 1" x ⅜" x ⅛", pigtail leads. (Same as R_8, R_{38}, R_{48}.)	1st r-f screen bleeder	SC-D-970
R_3	4	3Z4549	RESISTOR RS-149; fixed, composition, insulated, 40,000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia., pigtail leads. (Same as R_9, R_{21}, R_{26}.)	1st r-f screen divider	SC-D-970

Par 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd) —

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
R_4	4	3Z4572	RESISTOR RS-172; fixed, composition, insulated, 100,000 ohm, ±10%, ⅓ watt, ⅜" long, ⅛" dia., pigtail leads. (Same as R_{10}, R_{16}, R_{18}.)	1st r-f AVC filter	SC-D-970
R_5	5	3Z4525	RESISTOR RS-125; fixed, composition, insulated, 1000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia., pigtail leads. (Same as R_{11}, R_{17}, R_{22}, R_{27}.) (Used in all receivers except BC-312, BC-312-A, BC-342.)	1st detector "B" supply filter	SC-D-970
		3Z4567	RESISTOR RS-167; fixed, composition, 1000 ohm, ±10%, ⅓ watt, ⅜" long, ⅛" dia., pigtail leads. (Same as R_{11}.) (Used in BC-312, BC-312-A, BC-342.)		
R_6	3	3Z4573	RESISTOR RS-173; fixed, composition, 2 megohm, ±10%, ⅓ watt, ⅜" long, ⅛" dia., pigtail leads. (Same as R_{12}, R_{53}.)	2d r-f grid input	SC-D-970
R_7	—	—	RESISTOR RS-164; (Same as R_1.)	2d r-f cathode bias	—
R_8	—	—	RESISTOR RS-169; (Same as R_2.)	2d r-f screen bleeder	—
R_9	—	—	RESISTOR RS-149; (Same as R_3.)	2d r-f screen divider	—
R_{10}	—	—	RESISTOR RS-172; (Same as R_4.)	2d r-f AVC filter	—
R_{11}	—	—	RESISTOR RS-125; (Same as R_5.) Used in all receivers except BC-312, BC-312-A, BC-342.)	2nd r-f "B" supply filter	—
		—	RESISTOR RS-167; (Same as R_5.) (Used in BC-312, BC-312-A, BC-342.)		

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
R_{12}	—	—	RESISTOR RS-173; (Same as R_6.)	1st detector grid input	—
R_{13}	1	3Z4568	RESISTOR RS-168; fixed, composition, 50,000 ohm, ±10%, ⅓ watt, ⅜" long, ⅛" dia., pigtail leads.	1st detector injector grid input	SC-D-970
R_{14}	1	3Z4566	RESISTOR RS-166; fixed, wire-wound, insulated, 350 ohm, ±10%, 1 watt, 1" x ⅜" x ⅛", pigtail leads.	1st detector cathode bias	SC-D-970
R_{15}	3	3Z4540	RESISTOR RS-140; fixed, composition, insulated, 30,000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia., pigtail leads. (Same as R_{42}, R_{50}.)	1st detector screen divider	SC-D-970
R_{16}	—	—	RESISTOR RS-172; (Same as R_4.)	1st detector AVC filter	—
R_{17}	—	†	RESISTOR RS-125; (Same as R_5.)	1st detector "B" supply filter	—
R_{18}	—	†	RESISTOR RS-172; (Same as R_4.) (Not used in BC-312-N, NX.)	1st i-f grid input	—
R_{19}	—	—	RESISTOR RS-164; (Same as R_1.)	1st i-f cathode bias	—
R_{20}	2	3Z4563	RESISTOR RS-163; fixed, composition, insulated, 60,000 ohm, ±10%, 1 watt, 7/8" long, 9/32" dia., pigtail leads. (Same as R_{25}.)	1st i-f screen bleeder	SC-D-970
R_{21}	—	—	RESISTOR RS-149; (Same as R_3.)	1st i-f screen divider	—
R_{22}	—	—	RESISTOR RS-125; (Same as R_5.)	1st i-f "B" supply filter	—
R_{23}	2	3Z4550	RESISTOR RS-150; fixed, composition, insulated, 100,000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia., pigtail leads. (Same as R_{37}.)	2d i-f AVC filter	SC-D-970

†Part of an assembly, not a replaceable part.

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
R_{24}	—	—	RESISTOR RS-164; (Same as R_1.)	2d i-f cathode bias	—
R_{25}	—	—	RESISTOR RS-163; (Same as R_{20}.)	2d i-f screen bleeder	—
R_{26}	—	—	RESISTOR RS-149; (Same as R_3.)	2d i-f screen divider	—
R_{27}	—	—	RESISTOR RS-125; (Same as R_5.)	2d i-f "B" supply filter	—
R_{28}	1	3Z4571	RESISTOR RS-171; fixed, wire-wound, insulated, 750 ohm, ±10%, 1 watt, 1" x ⅜" x ⅛"; pigtail leads.	1st audio cathode bias	SC-D-970
R_{29}	2	3Z4562	RESISTOR RS-162; fixed, composition, insulated, 250,000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia., pigtail leads. (Same as R_{32}.)	AVC filter	SC-D-970
R_{30}	1	3Z4561	RESISTOR RS-161; fixed, composition, insulated, 1 megohm, ±10%, ⅓ watt, ⅜" long, ⅛" dia., pigtail leads.	Diode AVC input	SC-D-970
R_{31}	2	3Z4623 3Z4565	RESISTOR RS-223; fixed, wire-wound, insulated, 2000 ohm, ±10%, 1 watt, pigtail leads. (Same as R_{54}.) (Used in all receivers except BC-312, BC-312-A, BC-342,) (Use to replace composition type resistor used in BC-312-M.) RESISTOR RS-165; fixed, wire-wound, insulated, 1000 ohm, ±10%, 1 watt, 1" x ⅜" x ⅛". (Used in BC-312, BC-312-A, BC-342.	2d audio cathode bias	SC-D-970
R_{32}	—	—	RESISTOR RS-162; (Same as R_{29}.)	1st audio grid input	—
R_{33}	1	3Z4531	RESISTOR RS-131; fixed, composition, insulated, 50,000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia., pigtail leads.	2d audio grid input	SC-D-970

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd) —

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
	1	2Z7289	POTENTIOMETER RS-174; dual-section, 1 watt.	Volume Control	SC-D-1982
R_{34}	—	—	Section D of RS-174; 0-500,000 ohm, ±10%, taper "L", right-hand.		
R_{35}	—	—	Section E of RS-174; 0-50,000 ohm, ±10%, taper "L", left-hand.		
R_{36}	1	3Z4511	RESISTOR RS-111; fixed, composition, insulated, 100,000 ohm, ±10%, 1 watt, 7/8" long, 9/32" dia., pigtail leads. (Used in all receivers except BC-312, BC-312-A, C, BC-342, BC-342-C.)	Cathode bias voltage divider	SC-D-970
		—	RESISTOR RS-150; (Same as R_{23}.) (Used in BC-312, BC-312-A, C, BC-342, BC-342-C.)		
R_{37}	—	—	RESISTOR RS-150; (Same as R_{23}.)	C-w oscillator plate	—
R_{38}	—	†	RESISTOR RS-169; (Same as R_{2}.) (Used in all receivers except BC-312, BC-312-A, BC-342.)	2d i-f transformer primary shunt	—
R_{38}		3Z4578	RESISTOR RS-178; fixed, metal-enclosed, 12 ohm, 15 watt, 14 volt. (Used only in BC-312, BC-312-A, BC-342.)	Heater	
R_{39}		—	RESISTOR RS-178; (Same as R_{38}.) (Used only in BC-312, BC-312-A, BC-342.)	Heater	
R_{40}		—	RESISTOR RS-178; (Same as R_{38}.) (Used only in BC-312, BC-312-A, BC-342.)	Heater	

†Part of an assembly, not a replaceable part.

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd) —

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
R_{40}		3Z4620	RESISTOR RS-220; fixed, composition, insulated, 65,000 ohm, 2 watts. (Used in BC-342-C, D, F, J, L, M, N only.)	Bleeder	SC-D-970
R_{41}	1	3Z4539	RESISTOR RS-139; fixed, composition, insulated, 30,000 ohm, ±10%, 1 watt, 7/8" long, 9/32" dia., pigtail leads. (Not used in BC-312-C.)	R-f oscillator plate dropping	SC-D-970
R_{42}	—	—	RESISTOR RS-140; (Same as R_{15}.)	R-f oscillator grid leak	—
R_{43}	1	3Z4548	RESISTOR RS-148; fixed, composition, insulated, 200,000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia., pigtail leads.	C-w oscillator grid leak	SC-D-970
R_{44}	1	3Z4635	RESISTOR RS-235; fixed, composition, insulated, 3000 ohm, ±10%, 1 watt, 7/8" long, 9/32" dia., pigtail leads. (Used in all receivers except BC-312, BC-312-A, BC-342.)	R-f oscillator cathode bias, band C	SC-D-970
		3Z4527	RESISTOR RS-127; insulated, 3000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia. (Used in BC-312, BC-312-A, BC-342.)		
R_{45}	1	3Z4637	RESISTOR RS-237; fixed, composition, insulated, 5000 ohm, ±10%, 1 watt, pigtail leads. (Used in all receivers except BC-312, BC-312-A, BC-342.)	R-f oscillator cathode bias, band B	SC-D-970
		3Z4528	RESISTOR RS-128; insulated, 5000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia. (Used in BC-312, BC-312-A, BC-342.)		

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
R_{46}	1	3Z4638 3Z4577	RESISTOR RS-238; fixed, composition, insulated, 7500 ohm, ±10%, 1 watt, pigtail leads. (Used in all receivers except BC-312, BC- 312-A, BC-342.) RESISTOR RS-177; insulated, 7500 ohm, ±10%, ½ watt, ⅝" long, ¼" dia. (Used in BC-312, BC-312-A, BC-342.)	R-f oscillator cathode bias, band A	SC-D-970
R_{47}	1	3Z4576	RESISTOR RS-176; fixed, composition, insulated, 60 ohm, ±10%, ½ watt, ⅝" long, ¼" dia., pigtail leads. (Not used in BC-312-NX or HX.)	Filament voltage equalizer	SC-D-970
R_{48}	—	—	RESISTOR RS-169; (Same as R_{2}.)	1st detector screen bleeder	—
R_{49}	1	3Z4533	RESISTOR RS-133; fixed, composition, insulated, 500,000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia.	2d detector diode output	SC-D-970
R_{50}	—	—	RESISTOR RS-140; (Same as R_{15}.)	1st detector screen divider	—
R_{51}	1	3Z4529	RESISTOR RS-129; fixed, composition, insulated, 10,000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia.	C-w oscillator output	SC-D-970
R_{52}	1	†	RESISTOR RS-175; fixed, composition, insulated, 10,000 ohm, ±10%, ⅓ watt, ⅜" long, ⅛" dia., pigtail leads.	1st i-f grid input	—

†Part of an assembly, not a replaceable part.

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
R_{53}	—	—	RESISTOR RS-173; (Same as R_{8}.)	1st r-f grid input	—
R_{54}	—	—	RESISTOR RS-223; (Same as R_{31}.) (Not used in BC-312, BC-312-A, BC-342.)	2d audio cathode bias	—
R_{55}		3Z4667	RESISTOR RS-267; molded, insulated, 75 ohm, 15 watt. (Used only in BC-312-HX, NX.)	Heater dropping VT-134	
R_{55}	1	3Z7256	RHEOSTAT RS-256; wire-wound, 75 ohm, 2 watt, grounded contact arm, off position in extreme counterclockwise position; ½" long shank threaded ⅜"-32 threads, complete with holding nut, ¼" dia., ⅝" long shaft, two terminals. (Used in BC-312-L, M.)	Dial light control	ES-A-6635
R_{56}	—	—	RHEOSTAT RS-256. (Same as R_{55}.) (Used in BC-312-N, NX.)	Dial light control	—
RA	1	2Z7512	RECTIFIER RA-20; complete a-c power supply, 110-120 v. 60-cycle input, 250 v. d.c., 95 milliamperes output, two 12 v. a.c. filament supplies; contains power transformer, filter choke, electrolytic capacitor, ON-OFF switch, fuse and holder, input plug, bleeder resistor, terminal board, and tube socket. (Used in BC-342, BC-342-C, D, F, J, L, M, N.)	Power supply	SC-D-1609 Farn., RA-20

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
RL_1	1	2Z7613	RELAY BK-13; closes at 8.5 v. when mounted in a vertical position, 60 ohms d-c resistance, coil consists of 2100 turns AWG #32 silk enamelled wire, 25 layers wound on iron core. (Not used in BC-312-HX, NX.)	Antenna grounding	SC-D-1942
RL_2		2Z7641A	RELAY BK-41-A; double-pole, single-throw, 24 volt coil. (Used in BC-312-HX, NX.)	Antenna grounding	
SO_1	1	2Z8794.1	SOCKET SO-94; aluminum alloy shell, 14 contacts, four mounting holes 0.1285" in dia., 1-1/16" between centers, 18 threads per in., V threads, pitch dia. 1.393".	Power supply and control connector	SC-D-2592
SO_2		6Z7589	CONNECTOR; two-contact. (Used only in BC-342-C, D, F, J, N.)	A-c input	SC-D-1610
SW_1	1	3Z8131	SWITCH SW-131; toggle, SPST, 3 ampere, 250 volt, 15/32" threaded shank, complete with two hex nuts.	Send-receive	SC-A-1042
SW_2	8	3Z8310-2	SWITCH; gang section, ceramic stator plates, single rotor contact, "X" type spring tempered brass, silver plated. (Same as SW_3, SW_4, SW_5, SW_6, SW_7, SW_8, SW_9.)	Band change, 1st r-f grid	SC-D-4046

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Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
SW_3	—	—	SWITCH; (Same as SW_2.) (Except BC-312, BC-312-A, C, BC-342, BC-342-C.)	Band change, 1st r-f antenna	—
	1	—	SWITCH; made in accordance with RCA dwg. KX289313, part 1. (BC-312, BC-312-A, C, BC-342, BC-342-C only.)		
SW_4	—	—	SWITCH; (Same as SW_2.)	Band change, 2d r-f grid	—
SW_5	—	—	SWITCH; (Same as SW_2.)	Band change, 1st r-f plate	—
SW_6	—	—	SWITCH; (Same as SW_2.)	Band change, 1st detector grid	—
SW_7	—	—	SWITCH; (Same as SW_2.)	Band change, 2d r-f plate	—
SW_8	—	—	SWITCH; (Same as SW_2.)	Band change, r-f oscillator grid	—
SW_9	—	—	SWITCH; (Same as SW_2.)	Band change, r-f oscillator plate	—
SW_{10}	—		SWITCH; ganged to C_{51}. (Not used in BC-312-L, M, N, or NX.)	Crystal switch	SC-D-2564
SW_{11}	1	3Z8139	SWITCH SW-139; toggle, SPST, 13/32" threaded shank, complete with two hex nuts. (Used in all receivers except BC-312, BC-312-A, BC-342.)	C-w oscillator control	SC-A-1042
		3Z8105	SWITCH SW-105; toggle, SPST, 3-ampere, 250 volts. (Used only in BC-312, BC-312-A, BC-342.)		

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
SW_{12}	1	3Z8119	SWITCH SW-119; three-position, rotary, off position in extreme counterclockwise direction, brass bushing, ⅜"-32 threads, ⅜" long, ¼" dia., ½" long nickel silver shaft, all terminals hot tin dipped.	OFF-MVC-AVC	SC-D-2574
SW_{13}	—	—	SWITCH SW-131; (Same as SW_1.) (Used only in BC-312, BC-312-A, BC-342.)	Heater switch	—
SW_{13}		—	SWITCH SW-105; (Same as SW_{11}.) (Used only in BC-342-(*).)	A-c line switch in RA-20	—
T_1	1	2Z9805	TRANSFORMER C-205; made from C-124 by soldering brackets in place.	Audio interstage	SC-D-2567
T_2	• 1	2Z9760	‡TRANSFORMER C-160; primary 5000 turns, secondary 1885 turns, 2⅜" between centers of mounting bracket.	Audio output	SC-D-2569
		2Z9760A	TRANSFORMER C-160-A; Secondary tapped at 250 ohms, otherwise same as above.		
T_3	1	2Z9828	TRANSFORMER C-228; power transformer, 110-120 volt, 60 cycle primary; 700 volt, ±5%, center tapped, 100 milliampere secondary; rectifier heater 5 volt ±2½%, 3 ampere; heater supply 12.5 volt, 2 ampere; auxiliary heater supply 12.5 volt ±5%, 3 ampere. (Used only in BC-342-(*).)	Rectifier transformer in RA-20	SC-D-1598

‡When stock is depleted use TRANSFORMER C-160-A.

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
THS_1	1	2Z9182	THERMOSTAT BK-12; 2.3 amperes, 14 volts, normally closed, opens at 111° F. (Used in BC-312, BC-312-A, BC-342 only.)	Oscillator compartment temperature control	SC-A-2590
THS_2	1	2Z9181	THERMOSTAT BK-11; 1.15 amperes, 14 volts, normally closed, opens at 109° F. (Used in BC-312, BC-312-A, BC-342 only.)		
	2	3H1621A/3	BRUSH; input (dynamotor), carbon, with ⅞-inch pigtail and spring soldered to end cap, 1/4" x 11/64" x 9/16", 1-5/8" overall length. (Not used in BC-342-(*).)	Low voltage	SC-D-2723
	2	3H1621A/4	BRUSH; output (dynamotor), carbon, with ⅞" pigtail and spring soldered to end cap ¼" x ½". (Not used in BC-342-(*).)	High voltage	SC-D-2723
	1	2Z1650/16.1	DIAL AND GEAR ASSEMBLY, (split gear tuning dial.)	For tuning	SC-D-5431 RCA, MX-244065-501 Farn., 98-1339
	1	2Z8550	SHUTTER ASSEMBLY	To blank out portion of tuning dial not being used	SC-D-5431 Farn., 98-1246 RCA, MX-243063-502
	1	2Z7560/2	PANE; dial, clear glass, 2-39/64" long, 1/16" thick, 2" wide at one end and ¾" wide at the other end.	Dial pane	SC-D-2535-13

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
	—	2Z5986	LAMP MOUNTING ASSEMBLY; consisting of:	For dial lamps	
	1	2Z5986/1	(A) MOUNTING; right hand for lamp, miniature bayonet base.		SC-D-2573-1
	1	2Z5986/2	(B) MOUNTING; left hand. (Same as above except for bracket, which is of opposite hand.)		SC-D-2573-2
	3	3Z3275	FUSE MOUNTING; 2-13/32" long, complete with bright zinc plated nut and neoprene washer.	Fuse holder	SC-D-2532-76 Farn., 98-1021 RCA, K-99088-2
	1	2Z6702	MOUNTING FT-162; consisting of: 4 aluminum alloy bases, 4 aluminum alloy mounting supports, 4 steel studs and 4 felt pads, mounted on steel plate ⅛" thick, 18" long, 6.906" wide.	Receiver mounting	SC-D-2577
	1	2C4314G/B2	BRACKET ASSEMBLY; (Not used in BC-342-(*).)	Dynamotor mounting	SC-D-2532 Farn., 98-1346 RCA, K-881940-501
	1	2Z5650-K	JACK COVER ASSEMBLY; consisting of: cover, 0.843" x 0.750" x 0.21875", brass cover support, spring and pad, word "KEY" engraved on cover.	Key Jack	SC-D-2532-36

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
	1	2Z5650-M	JACK COVER ASSEMBLY; (Same as 2Z5650-K except for word "MICRO" engraved on cover.)	Microphone jack	SC-D-2532-37
	1	2Z5650-S2A	JACK COVER ASSEMBLY; (Same as 2Z5650-K except for words "SPEAKER 2ND AUDIO" engraved on cover.)	Speaker, 2d audio jack	SC-D-2532-38
	2	2Z5650-P2A	JACK COVER ASSEMBLY; (Same as 2Z5650-K except for words "PHONES 2ND AUDIO" engraved on cover.)	Phones, 2d audio jack	SC-D-2532-39
		2Z5650-P1A	JACK COVER ASSEMBLY; (Same as 2Z5650-K except for words "PHONES 1ST AUDIO" engraved on cover.) (Except BC-312-L, M, N, NX, BC-342-L, M, N.)	Phones, 1st audio jack	SC-D-2532-40
	1	2Z8794.1/C1	COVER; aluminum die casting, 2-5/8" high, 2-5/32" wide, 1-43/64" deep.	Cover for socket SO-94	SC-D-2534-6
	1	3Z510	BINDING POST ASSEMBLY.	Alternate signal antenna	SC-D-2532-71
	1	3Z763	BINDING POST ASSEMBLY.	Ground	SC-D-2532-78
	1	2C4312/N1	NUT AND FERRULE ASSEMBLY.	Cable connection for shielded binding post	SC-D-2578
	1	2Z5782.1	KNOB, SHAFT, AND PINION ASSEMBLY; consists of: compression nut, pinion, spring washer, knob, shaft, setscrew and standard #6 split-spring washer.	Fast tuning drive	SC-D-5431 RCA, KX-381510-501
		2Z5782.2	FAST TUNING KNOB AND DRIVE ASSEMBLY, (Same as above except includes eccentric bushing in assembly.)		Farn., 98-1469

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
	1	2Z5778	KNOB ASSEMBLY; with insert and setscrew; arrow engraved on face.	OFF-MVC-AVC	SC-D-2532-43
	1	2Z5779	KNOB ASSEMBLY; with insert and setscrew; "ALIGN INPUT" engraved on face.	Align input	SC-D-2532-44
	1	2Z5780	KNOB ASSEMBLY; with insert and setscrew, "CW-OSC ADJUST" engraved on face.	C-w oscillator adjustment	SC-D-2561-17
	1	2Z5773	KNOB ASSEMBLY; consists of: 1 each knob, dial, insert, 3 F. H. machine screws and 1 #8-32, ⅜" setscrew.	Volume control	SC-D-2532-45
	1	2Z5783	KNOB; zinc alloy die casting, knurled, with arrow engraved on face, O. D. 1-11/16", 1⅛" overall thickness, 0.1927" wide slot, hub dia. ¾".	Band change	SC-D-5431-56
	1	2Z5777	KNOB; bakelite, with insert and setscrew.	Crystal phasing	SC-D-730
	1	2Z5777.1	KNOB; (Used only in BC-312-J, L, M, N, NX.)	Pilot light dimmer	SC-D-730
	1	2Z5842-5	KNOB; Vernier, assembly consisting of: aluminum dial, clutch, knob and screw.	Vernier tuning	SC-D-5431-58
	1	3G1921-1	INSULATOR ASSEMBLY	For leads through r-f coil box assembly	SC-D-2553

Par. 40 *a*. Radio Receivers BC-312-(*), BC-312-(*)X and BC-342-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
	1	3G1921	TERMINAL ASSEMBLY; (insulators.)	For leads through mounting shelf	SC-D-2538
	5	2Z6931/21	LOCKSCREW AND NUT ASSEMBLY; panel lock, medium straight knurled head 11/16" long, 5/8" dia., for 3/16" panel.	Secures panel to box	SC-D-2532
	1	2Z1650/42	SHAFT; switch, steel, 10½" long.	Removable band switch shaft	SC-D-5431-42
	1	2Z1650/17.2	SPRING; music wire.	For switch detent plunger	SC-D-5431-6
	1	2Z1650/7.3	SPRING; music wire.	For anti-backlash gears	SC-D-5431-14
	1	2Z1650/7.4	SPRING; music wire.	For tuning capacitor worm gear	SC-D-5431-36
	1	2Z1650/2	BALL; steel, 0.21875" dia.	For switch detent	SC-D-5431-94
	1	6L6632-9.10	SCREW; brass, tapered, slotted flat fillister head.	Secure dial & shutter shaft	SC-D-5431-4
	1	6L7949-4.89S	SCREW; steel, headless pilot point setscrew.	Secure band switch wafer shaft	SC-D-5431-85
	9	2Z8762.2	SOCKET; octal, 8 "cinch" type contacts, phosphor bronze silver plated, complete with #4 nickel plated beryllium copper retaining ring.	Vacuum tubes sockets	SC-D-2538-63
	1	2C8795.11	SOCKET; 8 prong octal with mounting plate.	VT-97 tube socket	SC-D-1612-24
	1	6L50514-1	WASHER; fiber, gray vulcan ½" OD.	Spacer	SC-D-2550-61

b. Radio Receivers BC-314-(*) and BC-344-(*).—

NOTE: Unless otherwise indicated, parts as listed apply to all equipments covered by this manual.

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_1	1	3D293	CAPACITOR CA-293; variable, air, 10-210 $\mu\mu$f, isolantite base, overall length 3-9/16" x 1-9/32" high, plates, studs, and shaft silver plated.	Antenna alignment	SC-A-2580
C_2	16	3D290	CAPACITOR CA-290; variable, air, 4-50 $\mu\mu$f, 14 plates, 0.008" minimum spacing between rotor and stator plates, isolantite base, overall length 1½", screwdriver adjustment, special contact spider, plates and wiper contacts silver or nickel plated, all other parts nickel plated. (Same as C_3, C_4, C_5, C_{11}, C_{12}, C_{13}, C_{14}, C_{20}, C_{21}, C_{22}, C_{23}, C_{24}, C_{25}, C_{26}, and C_{27}.)	Band D trimmer, 1st r-f	SC-A-1728
C_3	—	—	CAPACITOR CA-290; (Same as C_2.)	Band C trimmer, 1st r-f	—
C_4	—	—	CAPACITOR CA-290; (Same as C_2.)	Band B trimmer, 1st r-f	—
C_5	—	—	CAPACITOR CA-290; (Same as C_2.)	Band A trimmer, 1st r-f	—
C_6	9	3D277	CAPACITOR CA-277; fixed, 0.1 μf ±10%, 400 v. d.c. working, paper, pigtail leads. (Same as C_{15}, C_{37}, C_{39}, C_{65}, C_{72}, C_{73}, C_{76}, and C_{81}.)	R-F oscillator plate bypass	SC-D-1995
—	1	3D340	CAPACITOR CA-340; variable, air, 13-256 $\mu\mu$f, 4 sections. (C_7, C_{16}, C_{46}, and C_{67}.)	Tuning gang	SC-D-2568

Par. 40 *b.* Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_7	—	—	One section of CA-340; (See preceding item.)	1st r-f tuning	
—	3	3D255	CAPACITOR CA-255; fixed, 3 section, each 0.1 μf +14% —6%, 400 v. d.c. working, paper, oil impregnated, 3 terminals, metal case. (C_8, C_9, and C_{10}; C_{17}, C_{18}, and C_{19}; C_{48}, C_{49}, and C_{50}.)		SC-D-512
C_8	—	—	One section of CA-255; (See preceding item.)	1st r-f cathode bypass	—
C_9	—	—	One section of CA-255; (Same as C_8.)	1st r-f screen bypass	—
C_{10}	—	—	One section of CA-255; (Same as C_8.)	1st r-f "B" supply bypass	—
C_{11}	—	—	CAPACITOR CA-290; (Same as C_2.)	Band C trimmer, 2d r-f	—
C_{12}	—	—	CAPACITOR CA-290; (Same as C_2.)	Band B trimmer, 2d r-f	—
C_{13}	—	—	CAPACITOR CA-290; (Same as C_2.)	Band A trimmer, 2d r-f	—
C_{14}	—	—	CAPACITOR CA-290; (Same as C_2.)	Band D trimmer, 2d r-f	—
C_{15}	—	—	CAPACITOR CA-277; (Same as C_6.)	2d r-f AVC bypass	—
C_{16}	—	—	One section of CA-340; (Same as C_7.)	2d r-f tuning	—
C_{17}	—	—	One section of CA-255; (Same as C_8.)	2d r-f cathode bypass	—
C_{18}	—	—	One section of CA-255; (Same as C_8.)	2d r-f screen bypass	—
C_{19}	—	—	One section of CA-255; (Same as C_8.)	2d r-f "B" supply bypass	—
C_{20}	—	—	CAPACITOR CA-290; (Same as C_2.)	Band C trimmer, 1st detector	—
C_{21}	—	—	CAPACITOR CA-290; (Same as C_2.)	Band B trimmer, 1st detector	—

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd) —

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{22}	—	—	CAPACITOR CA-290; (Same as C_{2}.)	Band A trimmer, 1st detector	—
C_{23}	—	—	CAPACITOR CA-290; (Same as C_{2}.)	Band D trimmer, r-f oscillator	—
C_{24}	—	—	CAPACITOR CA-290; (Same as C_{2}.)	Band C trimmer, r-f oscillator	—
C_{25}	—	—	CAPACITOR CA-290; (Same as C_{2}.)	Band B trimmer, r-f oscillator	—
C_{26}	—	—	CAPACITOR CA-290; (Same as C_{2}.)	Band A trimmer, r-f oscillator	—
C_{27}	—	—	CAPACITOR CA-290; (Same as C_{2}.)	Band D trimmer, 1st detector	—
C_{28}	1	3D348	CAPACITOR CA-348; fixed, 2500 $\mu\mu f$ ±2%, 400 v. d.c. working, silver mica, pigtail leads.	Band D padder, r-f oscillator	SC-D-1993
C_{29}	1	3D347	CAPACITOR CA-347; fixed, 2000 $\mu\mu f$ ±2%, 400 v. d.c. working, silver mica, pigtail leads.	Band C padder, r-f oscillator	SC-D-1993
C_{30}	2	3D346	CAPACITOR CA-346; fixed, 900 $\mu\mu f$ ±2%, 400 v. d.c. working, silver mica, pigtail leads. (Same as C_{32}.)	Band B padder, r-f oscillator	SC-D-1993
C_{31}	1	3D345	CAPACITOR CA-345; fixed, 800 $\mu\mu f$ ±2%, 400 v. d.c. working, silver mica, pigtail leads.	Band A padder, r-f oscillator	SC-D-1993

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd) —

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{32}	—	†	CAPACITOR CA-344; fixed, 400 $\mu\mu f$ ±2%, 400 v. d.c. working, silver mica, pigtail leads. (Same as C_{34}, C_{36}, C_{40}, and C_{42}.) (Except BC-314 and BC-344.)	1st detector i-f tuning	SC-D-1993
		†	CAPACITOR CA-343; fixed, 125 $\mu\mu f$, 400 v. d.c. working, mica. (Used in BC-314 and BC-344 only.)		
C_{33}	—	†	CAPACITOR CA-371; fixed, 0.01 μf ±10%, 450 v. d.c. working, mica, 1¼" between centers of mounting holes, rigid pigtail leads. (Same as C_{35}, C_{42}, and C_{43}.) (Except BC-314, BC-314-G, BC-344, and BC-344-D.)	1st detector bypass	RL-D-6222
		†	CAPACITOR CA-281; fixed, 0.01 μf ±10%, 400 v. d.c. working, paper, pigtail leads. (Used in BC-314, BC-314-G, BC-344, and BC-344-D.)		SC-D-1995
C_{34}	—	†	CAPACITOR CA-344; (Same as C_{32}.) (Except BC-314 and BC-344.)	1st detector i-f primary tuning	—
		†	CAPACITOR CA-342; fixed, 100 $\mu\mu f$ ±2%, 400 v. d.c. working, silver mica, pigtail leads. (Used in BC-314 and BC-344 only.)		

†Part of an assembly, not a replaceable part.

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd) —

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{35}	—	†	CAPACITOR CA-371; (Same as C_{33}.)	1st detector plate bypass	—
		†	CAPACITOR CA-281; (Same as C_{33}.) (Used in BC-314, BC-314-G, BC-344 and BC-344D.)		
C_{36}	—	†	CAPACITOR CA-344; (Same as C_{32}.)	1st i-f tuning	—
C_{37}	—	†	CAPACITOR CA-277; (Same as C_{6}.)	1st i-f "B" supply bypass	—
C_{38}	—	†	CAPACITOR CA-372; fixed, 1000 $\mu\mu f$ ±2%, 250 v. d.c. working, silver mica, pigtail leads. (Except BC-314 and BC-344.)	1st i-f coupling	SC-D-1993
		†	CAPACITOR CA-352; fixed, 1000 $\mu\mu f$ ±2%, 400 v. d.c. working, mica. (Used in BC-314 and BC-344 only.)		
C_{39}	—	†	CAPACITOR CA-277; (Same as C_{6}.)	2d i-f AVC bypass	—
C_{40}	—	†	CAPACITOR CA-344; (Same as C_{32}.)	2d i-f secondary tuning	—
C_{41}	—	†	CAPACITOR CA-344; (Same as C_{32}.)	2d i-f primary tuning	—
C_{42}	—	†	CAPACITOR CA-371 or CAPACITOR CA-281; (Same as C_{33}.)	2d i-f plate bypass	—
C_{43}	—	—	CAPACITOR CA-371 or CAPACITOR CA-281; (Same as C_{33}.)	2d a-f grid coupling	—
C_{44}	1	3D279	CAPACITOR CA-279; fixed, 10 $\mu\mu f$ +14% —6%, 300 v. d.c. working, mica, pigtail leads. (Use to replace Erie type NPO-K, 10 $\mu\mu f$ +14% —6%, 300 v. d.c. working, in BC-314-E and BC-314-F.)	C-w oscillator coupling	SC-D-1993

†Part of an assembly, not a replaceable part.

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd) —

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{45}	1	3D350	CAPACITOR CA-350; fixed, 25 $\mu\mu f$ +14% —6%, 300 v. d.c. working, mica, pigtail leads. (Use to replace Erie type N400K, 20 $\mu\mu f$, +14% —6%, 300 v. d.c. working, in BC-314-E and BC-314-F.)	AVC diode coupling	SC-D-1993
C_{46}	—	—	One section of CA-340; (Same as C_{7}.)	1st detector tuning	
C_{47}	1	3D349	CAPACITOR CA-349; fixed, 150 $\mu\mu f$ +14% —6%, 250 v. d.c. working, mica, pigtail leads.	1st detector coupling to r-f oscillator	SC-D-1993
C_{48}	—	—	One section of CA-255; (Same as C_{8}.)	1st detector cathode bypass	—
C_{49}	—	—	One section of CA-255; (Same as C_{8}.)	1st detector screen bypass	—
C_{50}	—	—	One section of CA-255; (Same as C_{8}.)	1st detector "B" supply bypass	—
—	1	3D339	CAPACITOR CA-339; fixed, 3 section, each 0.1 μf +14% —6%, 400 v. d.c. working, paper, oil impregnated, 3 terminals, metal case, 1.738" long, 1-9/16" high, 9/16" wide, one mounting bracket at side and other at front. (C_{51}, C_{52}, and C_{53}.)		SC-D-2567
C_{51}	—	—	One section of CA-339; (See preceding item.)	1st i-f cathode bypass	—
C_{52}	—	—	One section of CA-339; (Same as C_{51}.)	1st i-f screen bypass	—
C_{53}	—	—	One section of CA-339; (Same as C_{51}.)	1st i-f "B" supply bypass	—

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Equip. Quan.in	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
—	2	3D338	CAPACITOR CA-338; fixed, 3 section, each 0.1 μf +14% —6%, 400 v. d.c. working, paper, oil impregnated, 3 terminals, metal case 1.738" long, 1-9/16" high, 9/16" wide, mounting brackets at right angles. (C_{54}, C_{55}, and C_{56}; C_{57}, C_{58}, and $_{59}$.)		SC-D-2567
C_{54}	—	—	One section of CA-338; (See preceding item.)	2d i-f cathode bypass	—
C_{55}	—	—	One section of CA-338; (Same as C_{54}.)	2d i-f screen bypass	—
C_{56}	—	—	One section of CA-338; (Same as C_{54}.)	2d i-f "B" supply bypass	—
C_{57}	—	—	One section of CA-338; (Same as C_{54}.)	1st audio "B" supply bypass	—
C_{58}	—	—	One section of CA-338; (Same as C_{54}.)	1st audio cathode bypass	—
C_{59}	—	—	One section of CA-338; (Same as C_{54}.)	AVC bypass	—
C_{60}	1	3D275	CAPACITOR CA-275; fixed. 4 μf +14% —6%, 50 v. d.c. working, paper, 2 terminals, sealed in metal case 2" long, 2" high, 1" wide, 2⅜" between centers of mounting brackets.	2d audio cathode bypass	SC-D-512
—	1	3D276	CAPACITOR CA-276; fixed, 3 section, each 0.1 μf +14% —6%, 400 v. d.c. working, paper, 3 terminals, metal case 1-27/32" long, 1" wide, 13/16" high, 2⅛" between centers of mounting brackets. (C_{61}, C_{62} and C_{63}.)		SC-D-512

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Equip. Quan.in	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{61}	—	—	One section of CA-276; (See preceding item.)	—"A" supply bypass	—
C_{62}	—	—	One section of CA-276; (Same as C_{61}.)	+"A" supply bypass	—
C_{63}	—	—	One section of CA-276; (Same as C_{61}.)	2d audio "B" supply bypass	—
C_{64}	—	—	CAPACITOR CA-281; (Same as C_{33}.)	1st audio grid coupling	—
C_{65}	—	—	CAPACITOR CA-277; (Same as C_6.)	C-w oscillator plate bypass	—
C_{66}	1	3D364	CAPACITOR CA-364; fixed, 250 μμf +14% —6%, 250 v. d.c. working, mica, pigtail leads.	R-f oscillator grid coupling	SC-D-1993
C_{67}	—	—	One section of CA-340; (Same as C_7.)	R-f oscillator tuning	—
C_{68}	1	3D253	CAPACITOR CA-253; variable, air, 4-75 μμf, 20 plates, 0.008" minimum spacing between rotor and stator plates, isolantite base, overall length 1-15/32", screwdriver adjustment, special contact spider, plates and wiper contacts silver or nickel plated.	C-w oscillator tuning	SC-A-1728
C_{69}	1	3D384	CAPACITOR CA-384; variable, air, 6-100 μμf, 27 plates, 0.008" minimum spacing between rotor and stator plates, isolantite base, special contact spider, plates and wiper contacts silver or nickel plated.	C-w oscillator trimmer	SC-A-1728

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{70}	2	3D211	CAPACITOR CA-211; fixed, 2000 $\mu\mu$f +14% —6%, 250 v. d.c. working, mica, pigtail leads. (Same as C_{71}.) (Used in BC-314 and BC-344 only.)	Thermostat bypass	SC-D-1993
C_{71}	—	—	CAPACITOR CA-211; (Same as C_{70}.) (Used in BC-314 and BC-344 only.)	Thermostat bypass	—
C_{72}	—	—	CAPACITOR CA-277; (Same as C_6.)	R-f oscillator "B" supply bypass	—
C_{73}	—	—	CAPACITOR CA-277; (Same as C_6.)	1st detector AVC bypass	—
C_{74}	1	3D266	CAPACITOR CA-266; fixed, 100 $\mu\mu$f +14% —6%, 250 v. d.c. working, mica, pigtail leads.	C-w oscillator grid coupling	SC-D-1993
C_{75}	1	3D193	CAPACITOR CA-193; fixed, 500 $\mu\mu$f +14% —6%, 250 v. d.c. working, mica, closed type terminals.	2d detector output filter	SC-D-1993
C_{76}	—	—	CAPACITOR CA-277; (Same as C_6.)	1st r-f "B" supply bypass	—
C_{77}	6	3D341	CAPACITOR CA-341; fixed, 25 $\mu\mu$f ±2%, 400 v. d.c. working, silver mica, pigtail leads. (Same as C_{78}, C_{83}, C_{84}, C_{85}, and C_{86}.) (Use to replace Erie type N400K, 25 $\mu\mu$f ±5%, 400 v. d.c. working in BC-314-E and BC-314-F.)	2d r-f band B tuning	SC-D-1993
C_{78}	—	—	CAPACITOR CA-341; (Same as C_{77}.)	1st detector band B tuning	—

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
C_{79}	1	3D351	CAPACITOR CA-351; variable, air, 30 $\mu\mu$f max., silver plated. (Used in BC-314 and BC-344 only.)	Selectivity control	SC-A-2634
C_{80}	1	3D297	CAPACITOR CA-297; fixed, 1600 $\mu\mu$f ±2%, 250 v. d.c. working, silver mica, pigtail leads.	2d det. a-f bypass	SC-D-1993
C_{81}	—	—	CAPACITOR CA-277; (Same as C_6.)	2d r-f "B" supply bypass	—
C_{82}	—	—	CAPACITOR CA-346; (Same as C_{30}.)	C-w oscillator tuning	—
C_{83}	—	—	CAPACITOR CA-341; (Same as C_{77}.)	2d r-f band A tuning	—
C_{84}	—	—	CAPACITOR CA-341; (Same as C_{77}.)	1st detector band A tuning	—
C_{85}	—	—	CAPACITOR CA-341; (Same as C_{77}.) Except BC-344.)	2d r-f band D tuning	—
C_{86}	—	—	CAPACITOR CA-341; (Same as C_{77}.) Except BC-344.)	1st detector band D tuning	—
—	1	3D329	CAPACITOR CA-329; fixed, 2 section, each 8 μf, 450 v. d.c. working, electrolytic.		SC-A-1490
C_{85}	—	—	One section of CA-329. (Used in BC-344 only.) (See preceding item.)	"B" supply filter, RA-20	—
C_{86}	—	—	One section of CA-329. (Same as C_{85}.) (Used in BC-344 only.)	"B" supply filter, RA-20	—
C_{89}	—	—	One section of CA-329; (Same as C_{85}.) (BC-344-D only.)	"B" supply filter, RA-20	—
C_{90}	—	—	One section of CA-329; (Same as C_{85}.) (Used in BC-344-D only.)	"B" supply filter, RA-20	—

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Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
DM	1	3H1621( )	DYNAMOTOR DM-21-(*); power unit, 295 v. maximum output no load, 230 v. d.c. with filter, full load, input 11 to 14 v. d.c., 235 v. at 90 ma. output, 50° C. temperature rise, inclosed in metal case, uses filter FL-6-(*). (Except BC-344 and BC-344-D.)	High voltage power supply	SC-D-2723
F_1	2	3Z1921A	FUSE FU-21-A; cartridge, 10 amp. 25 v., 1¼" long, ¼" diameter.	Dynamotor and filament circuits	—
F_2	—	—	FUSE FU-21-A; (Same as F_1.)	Dial light circuit	—
F_3	1	3Z1927	FUSE FU-27; cartridge, 2 amp. 250 v., 1¼" long, ¼" diameter glass-enclosed. (Used in BC-344 and BC-344-D only.)	A-C Line	
FL	1	3Z18906( )	FILTER FL-6-(*); contains chokes and capacitors, sealed in metal case 2" high x 1-1/2" wide x 5" long, 5-3/16" between mounting centers.	Filter for dynamotor	SC-D-1866
J_1	3	2Z5534A	JACK JK-34-A; phone, open circuit type for ⅛" maximum panel, brass sleeve threaded ⅜"-32 threads, complete with phenolic ring, washer, locating plate, brass washer, nut, pin, and beryllium copper contact, cadmium plated. (Same as J_2 and J_5.)	§2d audio phones	SC-D-2339
J_2	—	—	JACK JK-34-A; (Same as J_1.)	2d audio phones	—

§Phones 1st audio in BC-314 and BC-344.

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
J_3	2	2Z5533A	JACK JK-33-A; phone, 3 circuit type for ⅛" maximum panel, brass sleeve threaded ⅜"-32 threads, complete with brass nut, pin, washer, ring, locating plate and 2 beryllium copper contacts, cadmium plated. (Same as J_4.)	Speaker	SC-D-2332
J_4	—	—	JACK JK-33-A; (Same as J_3.)	Microphone	—
J_5	—	—	JACK JK-34-A; (Same as J_1.)	Key	—
—	1	**2C4314G/A4 *2C4314F.1/A1	First r-f unit assembly consisting of: 5 terminal board assemblies; 2 gang switch sections, 4 CAPACITORS CA-290 (C_2-C_5), C_6, C_7, L_1-L_4.	1st r-f tuning unit	SC-D-2705 Farn., 2700-37 RCA, T-621251-502
L_1	1	3C1083A-3	COIL C-310	1st r-f, band D	
L_2	1	3C1083A-2	COIL C-309	1st r-f, band C	
L_3	1	3C1083A-1	COIL C-308	1st r-f, band B	
L_4	1	3C1083A	COIL C-307	1st r-f, band A	
—	1	**2C4314G/A3 *2C4314F.1/A2	Second r-f unit assembly, consisting of: 7 terminal board assemblies, 2 gang switch sections, 4 CAPACITORS CA-290 (C_{11}-C_{14}), C_{15}, C_{37}, C_{76}, C_{85}, L_5-L_{12}, R_7.	2d r-f tuning unit	SC-D-2705 Farn., 2700-38 RCA, T-621251-503
L_5, L_6	1	3C1083A-7	TRANSFORMER C-306.	2d r-f, band D	

**Used in BC-314-G and BC-344-D.
*Used in BC-314-C, D, E, F.

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd) —

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
L_7, L_8	1	3C1083A-6	TRANSFORMER C-305.	2d r-f, band C	
L_9, L_{10}	1	3C1083A-5	TRANSFORMER C-304.	2d r-f, band B	
L_{11}, L_{12}	1	3C1083A-4	TRANSFORMER C-303.	2d r-f, band A	
—	1	**2C4314G/A2 *2C4314F.1/A3	First detector unit assembly consisting of: 7 terminal board assemblies, 2 gang switch sections, 4 CAPACITORS CA-290 (C_{20}-C_{22}, C_{27}), C_{73}, C_{78}, C_{81}, C_{84}, C_{86}, L_{13}-L_{20}, R_{12}.	First detector tuning unit	SC-D-2705 Farn., 2700-36 RCA, T-621251-501
L_{13}, L_{14}	1	3C1083A-11	TRANSFORMER C-302	1st detector, band D	
L_{15}, L_{16}	1	3C1083A-10	TRANSFORMER C-301	1st detector, band C	
L_{17}, L_{18}	1	3C1083A-9	TRANSFORMER C-300	1st detector, band B	
L_{19}, L_{20}	1	3C1083A-8	TRANSFORMER C-299	1st detector, band A	
—	1	**2C4314G/A1 *2C4314F.1/A4	R-f oscillator unit assembly consisting of: 3 terminal strips, 2 gang switch sections, 4 CAPACITORS CA-290 (C_{23}-C_{26}), C_{28}-C_{31}, L_{21}-L_{28}.	R-f oscillator tuning unit	SC-D-2710 Farn., 2700-39 RCA, P-722223-501

**Used in BC-314-G and BC-344-D.
*Used in BC-314-C, D, E, F.

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
L_{21}, L_{22}	1	3C1083A-15	TRANSFORMER C-298.	R-f oscillator, band D	
L_{23}, L_{24}	1	3C1083A-14	TRANSFORMER C-297.	R-f oscillator, band C	
L_{25}, L_{26}	1	3C1083A-13	TRANSFORMER C-296.	R-f oscillator, band B	
L_{27}, L_{28}	1	3C1083A-12	TRANSFORMER C-295.	R-f oscillator, band A	
L_{29}, L_{30}	1	2Z9892	TRANSFORMER C-292; assembly consisting of: coil assembly and 2 core and stud assemblies, C_{32}-C_{35}, R_{17}, R_{18}. (Use to replace TRANSFORMER C-232 in BC-314 and BC-344.)	1st detector transformer	SC-D-4171 Farn., C-292 RCA, TX-261945-506
L_{31}	1	2Z9893	TRANSFORMER C-293; assembly consisting of: coil assembly, core and stud assembly, and mounting strip assembly, C_{36}-C_{39}, R_1, R_{51}. (Use to replace TRANSFORMER C-233 in BC-314 and BC-344.)	1st i-f transformer	SC-D-4171 Farn., C-293 RCA, TX-261945-504
L_{32}, L_{33}	1	2Z9894	TRANSFORMER C-294; assembly consisting of: coil assembly, core and stud assembly, and mounting strip assembly, C_{40}-C_{42}. (Use to replace TRANSFORMER C-234 in BC-314 and BC-344.)	2d i-f transformer	SC-D-4171 Farn., C-294 RCA, TX-261945-505

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd) —

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
L_{34}	1	2C2775/4	COIL assembly.	C-w oscillator	Farn., 98-1575 RCA, M-440916-501
L_{35}	1	3C227	COIL C-227; filter choke, 14.5 henry choke coil. (Used in BC-344 and BC-344-D only.)	Rectifier filter choke	SC-D-1489
LM_1	1	2Z5893	LAMP; neon, assembly.	Antenna circuit over-voltage protection	SC-A-1801
LM_2	2	2Z5927	LAMP LM-27; miniature bayonet base, 6.3 V. 0.25 amp. G. E. type #44.	Dial illumination	SC-D-2573
LM_3	—	—	LAMP LM-27; (Same as LM_2.)	Dial illumination	—
R_1	—	†	RESISTOR RS-161; fixed, composition, insulated, 1 megohm, ±10%, ⅓ watt, ⅜" long, ⅛" dia., pigtail leads.	2d i-f grid input	SC-D-970
R_2	2	3Z4566	RESISTOR RS-166; fixed, wire-wound, insulated, 350 ohm, ±10%, 1 watt, 1" x ⅜" x ⅛", pigtail leads. (Same as R_8.)	1st r-f cathode bias	SC-D-970
R_3	3	3Z4541	RESISTOR RS-141; fixed, composition, insulted, 75,000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia., pigtail leads. (Same as R_9, R_{45}.)	1st r-f screen bleeder	SC-D-970
R_4	4	3Z4549	RESISTOR RS-149; fixed, composition, insulated, 40,000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia., pigtail leads. (Same as R_{10}, R_{21}, R_{26}.)	1st r-f screen divider	SC-D-970

†Part of an assembly, not a replaceable part.

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
R_5	4	3Z4550	RESISTOR RS-150; fixed, composition, insulated, 100,000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia., pigtail leads. (Same as R_7, R_{12} R_{23}.)	1st r-f AVC filter	SC-D-970
R_6	4	3Z4525	RESISTOR RS-125; fixed, composition, insulated, 1000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia., pigtail leads. (Same as R_{11}, R_{22}, R_{27}.) (Used in all receivers except BC-314 and BC-344.)	1st r-f "B" supply filter	SC-D-970
		3Z4567	RESISTOR RS-167; fixed, composition, 1000 ohm, ±10%, ⅓ watt, ⅜" long, ⅛" dia., pigtail leads. (Used only in BC-314 and BC-344.)		
R_7	—	—	RESISTOR RS-150; (Same as R_5.)	2d r-f AVC filter	—
R_8	—	—	RESISTOR RS-166; (Same as R_2.)	2d r-f cathode bias	—
R_9	—	—	RESISTOR RS-141; (Same as R_3.)	2d r-f screen bleeder	—
R_{10}	—	—	RESISTOR RS-149; (Same as R_4.)	2d r-f screen divider	—
R_{11}	—	—	RESISTOR RS-125; (Same as R_6.) (Used in all receivers except BC-314, BC-344.)	2d r-f "B" supply filter	—
		—	RESISTOR RS-167; (Same as R_6.) (Used in BC-314, BC-344.)		

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
R_{12}	—	—	RESISTOR RS-150; (Same as R_5.)	1st detector AVC filter	—
R_{13}	1	3Z4539	RESISTOR RS-139; fixed, composition, insulated, 30,000 ohm, ±10%, 1 watt, ⅞" long, 9/32" dia., pigtail leads.	R-f oscillator plate dropping	SC-D-970
R_{14}	1	3Z4568	RESISTOR RS-168; fixed, composition, insulated, 50,000 ohm, ±10%, ⅓ watt, ⅜" long, ⅛" dia., pigtail leads.	1st detector injector grid input	SC-D-970
R_{15}	3	3Z4564	RESISTOR RS-164; fixed, wire-wound, insulated, 500 ohm, ±10%, 1 watt, 1" x ⅜" x ⅛", pigtail leads. (Same as R_{19}, R_{24}.)	1st detector cathode bias	SC-D-970
R_{16}	2	3Z4540	RESISTOR RS-140; fixed, composition, insulated, 30,000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia., pigtail leads. (Same as R_{33}.)	1st detector screen divider	SC-D-970
R_{17}	—	†	RESISTOR RS-125; (Same as R_6.)	1st detector "B" supply filter	—
R_{18}	—	†	RESISTOR RS-150; (Same as R_5.)	1st i-f AVC filter	—
R_{19}	—	—	RESISTOR RS-164; (Same as R_{15}.)	1st i-f cathode bias	—
R_{20}	2	3Z4563	RESISTOR RS-163; fixed, composition, insulated, 60,000 ohm, ±10%, 1 watt, ⅞" long, 9/32" dia., pigtail leads. (Same as R_{25}.)	1st i-f screen bleeder	SC-D-970
R_{21}	—	—	RESISTOR RS-149; (Same as R_4.)	1st i-f screen divider	—
R_{22}	—	—	RESISTOR RS-125; (Same as R_6.)	1st i-f "B" supply filter	—

†Part of an assembly, not a replaceable part.

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
R_{23}	—	—	RESISTOR RS-150; (Same as R_5.)	2d i-f AVC filter	—
R_{24}	—	—	RESISTOR RS-164; (Same as R_{15}.)	2d i-f cathode bias	—
R_{25}	—	—	RESISTOR RS-163; (Same as R_{20}.)	2d i-f screen bleeder	—
R_{26}	—	—	RESISTOR RS-149; (Same as R_4.)	2d i-f screen divider	—
R_{27}	—	—	RESISTOR RS-125; (Same as R_6.)	2d i-f "B" supply filter	—
R_{28}	2	3Z4531	RESISTOR RS-131; fixed, composition, insulated, 50,000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia., pigtail leads. (Same as R_{38}.)	2d detector diode output	SC-D-970
—	1	2Z7289	POTENTIOMETER RS-174; dual-section, 1 watt.		
R_{29}	—	—	Section D of RS-174; 0-500,000 ohm, ±10%, taper "L", right hand,	Volume control	SC-D-1982
R_{30}	—	—	Section E of RS-174; 0-50,000 ohm, ±10%, taper "L", left hand.		
R_{31}	4	3Z4562	RESISTOR RS-162; fixed, composition, insulated, 250,000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia., pigtail leads. (Same as R_{34}, R_{35}, R_{36}.)	AVC filter	SC-D-970
R_{32}	1	3Z4561	RESISTOR RS-161; fixed, composition, insulated, 1 megohm, ±10%, ⅓ watt, ⅜" long, ⅛" dia., pigtail leads.	Diode AVC input	SC-D-970

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
R_{33}	2	3Z4623	RESISTOR RS-223; fixed, wire-wound, insulated, 2000 ohm, ±10%, 1 watt, 1" x ⅜" x ⅛", pigtail leads. (Same as R_{52}.)	2d audio cathode bias	SC-D-970
R_{34}	—	—	RESISTOR RS-162; (Same as R_{31}.)	1st audio grid	—
R_{35}	—	—	RESISTOR RS-162; (Same as R_{31}.) (Except BC-314-G and BC-344-D.)	2d audio grid	—
R_{35}	—	—	RESISTOR RS-131; (Same as R_{28}.) (Used in BC-314-G and BC-344-D.)	2d audio grid	—
R_{36}	—	—	RESISTOR RS-162; (Same as R_{31}.)	C-w oscillator plate	—
R_{37}	1	3Z4571	RESISTOR RS-171; fixed, wire-wound, insulated, 750 ohm, ±10%, 1 watt, 1" x ⅜" x ⅛", pigtail leads.	1st audio cathode bias	SC-D-970
R_{38}	—	—	RESISTOR RS-131; (Same as R_{28}.)	R-f oscillator grid	—
R_{39}	1	3Z4548	RESISTOR RS-148; fixed, composition, insulated, 200,000 ohm, ±10%, ½ watt, ⅝" long, ¼" dia., pigtail leads.	C-w oscillator grid leak	SC-D-970
R_{40}		3Z4620	RESISTOR RS-220; fixed, composition, insulated, 65,000 ohm, 2 watts. (Used only in BC-344-D.)	Bleeder, RA-20	SC-D-970
R_{40}		3Z4578	RESISTOR RS-178; metal encased, 12 ohm, 15 watt, 14 volt. (Used only in BC-344.)	Heater	
R_{41}		—	RESISTOR RS-178; (Same as R_{40}.) (Used only in BC-344.)	Heater	

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
R_{42}		—	RESISTOR RS-178; (Same as R_{40}.) (Used only in BC-344.)	Heater	
R_{43}	1	3Z4576	RESISTOR RS-176; fixed, composition, insulated, 60 ohm, ±10%, ½ watt, ⅝" long, ¼" dia., pigtail leads.	Filament voltage equilizer	SC-D-970
R_{44}	1	3Z4511	RESISTOR RS-111; fixed, composition, insulated, 100,000 ohm, ±10%, 1 watt, ⅞" long, 9/32" dia., pigtail leads. (Used in all receivers except BC-314, BC-344.)	Cathode bias voltage divider	SC-D-970
		—	RESISTOR RS-150; (Same as R_5.) (Used only in BC-314, BC-344.)		
		—	RESISTOR RS-141; (Same as R_3.) (Used in all receivers except BC-314, BC-344.)		
R_{45}	—	—	RESISTOR RS-150; (Same as R_5.) (Used in BC-314, BC-344.)	1st detector screen bleeder	—
R_{46}		3Z4621	RESISTOR RS-221; fixed, composition, insulated, 75,000 ohm, ±10%, ⅓ watt, ⅜" long, 11/64" dia., (Used in BC-314, BC-344 only.)	L_{10} shunt	SC-D-970
R_{47}		—	RESISTOR RS-221; Same as R_{46}.) (Used in BC-314, BC-344 only.)	L_{12} shunt	—
R_{48}		—	RESISTOR RS-168; (Same as R_{14}.) (Used in BC-314, BC-344 only.)	L_{18} shunt	—

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
R_{49}		—	RESISTOR RS-168; (Same as R_{14}.) (Used in BC-314, BC-344 only.)	L_{20} shunt	—
R_{50}		—	RESISTOR RS-168; (Same as R_{14}.) (Used in BC-314, BC-344 only.)	L_{30} shunt	—
R_{51}	—	†	RESISTOR RS-131; (Same as R_{28}.)	1st i-f transformer shunt	—
R_{52}	—	—	RESISTOR RS-223; (Same as R_{33}.)	2d audio cathode bias	—
R_{53}	—	—	RESISTOR RS-140; (Same as R_{16}.)	1st detector screen divider	—
R_{54}	—	—	RESISTOR RS-220; (Same as R_{40}.) (Used in BC-344 only.)	Bleeder, RA-20	—
RA		2Z7512	RECTIFIER RA-20; complete a-c power supply, 110-120 v. 60-cycle input, 250 v. d.c. at 95 milliamperes output, two 12 v. a.c. filament supplies, contains power transformer filter choke, electrolytic condenser, ON-OFF switch, fuse and holder, input plug, bleeder resistor, terminal board, and tube socket. (Used only in BC-344-(*).)	Power supply	SC-D-1609
RL_1	1	2Z7613	RELAY BK-13; closes at 8.5 v. when mounted in a vertical position, 60 ohms d-c resistance, coil consists of 2100 turns AWG #32 silk enamelled wire, 25 layers wound on iron core.	Send-receive relay	SC-D-1942

†Part of an assembly, not a replaceable part.

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
SO_1	1	2Z8794.1	SOCKET SO-94; aluminum alloy shell, 14 contacts, four mounting holes 0.1285" in dia., 1-1/16" between centers, 18 threads per inch V threads, pitch dia., 1.393".	Power supply and control connector	SC-D-2592
SO_2		6Z7589	CONNECTOR; two-contact. (Used in BC-344-(*) only.)	A-c input	SC-D-1610
SW_1	1	3Z8131	SWITCH SW-131; toggle, SPST, 3 ampere, 250 volt, 15/32" threaded shank, complete with two hex nuts.	Send-receive	SC-A-1042
SW_2	8	3Z8310-2	SWITCH; gang section, ceramic stator plates, single rotor contact, "X" type spring tempered brass, silver plate. (Same as SW_3, SW_4, SW_5, SW_6, SW_7, SW_8, SW_9.)	Band change, 1st r-f grid	SC-D-4046-2
SW_3	—	—	SWITCH; (Same as SW_2.)	Band change, 1st r-f antenna	—
SW_4	—	—	SWITCH; (Same as SW_2.)	Band change, 2nd r-f grid	—
SW_5	—	—	SWITCH; (Same as SW_2.)	Band change, 1st r-f plate	—
SW_6	—	—	SWITCH; (Same as SW_2.)	Band change, 1st detector grid	—
SW_7	—	—	SWITCH; (Same as SW_2.)	Band change, 2nd r-f plate	—

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
SW_8	—	—	SWITCH; (Same as SW_2.)	Band change, r-f oscillator grid	—
SW_9	—	—	SWITCH; (Same as SW_2.)	Band change, r-f oscillator plate	—
SW_{10}	1	3Z8139	SWITCH SW-139; toggle, SPST, 13/32" threaded shank, complete with two hex nuts.	C-w oscillator control	SC-A-1042
SW_{11}	1	3Z8119	SWITCH SW-119; three position, rotary, off position in extreme counterclockwise direction, brass bushing, ⅜"-32 threads, ⅜" long, ¼" dia., ½" long nickel silver shaft, all terminals hot tin dipped.	OFF-MVC-AVC	SC-D-2574
SW_{12}		—	SWITCH SW-131; (Same as SW_1.) (Used in BC-314 and BC-344 only.)	Heater	SC-A-1042
SW_{13}		3Z8105	SWITCH SW-105; toggle, SPST, 3 ampere, 250 volt. (Used in BC-344-(*) only.)	A-c line switch in RA-20	SC-A-1042
T_1	1	2Z9805	TRANSFORMER C-205; made from C-124 by soldering brackets in place.	Audio interstage	SC-D-2567
T_2	1	2Z9760	‡TRANSFORMER C-160; primary 5000 turns, secondary 1885 turns, 2⅜" between centers of mounting bracket.	Audio output	SC-D-2569
		2Z9760A	TRANSFORMER C-160-A; Secondary tapped at 250 ohms, otherwise same as above.		

‡When stock is depleted use TRANSFORMER C-160-A.

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
T_3		2Z9828	TRANSFORMER C-228; power transformer, 110-120 volt, 60 cycle primary; 700 volt, ±5% center tapped, 100 milliampere, secondary; rectifier heater 5 volt ±2½%, 3 ampere; heater supply 12.5 volt, 2 ampere; auxiliary heater supply 12.5 volt ±5%, 3 ampere. (Used in BC-344-(*)).	Rectifier transformer in RA-20	SC-D-1598
THS_1	1	2Z9182	THERMOSTAT BK-12; 2.3 amperes, 14 volts, normally closed, opens at 111° F. (Used in BC-314, BC-344 only.)	Oscillator compartment temperature control	SC-A-2590
THS_2	1	2Z9181	THERMOSTAT BK-11; 1.15 amperes, 14 volts, normally closed, opens at 109° F. (Used in BC-314, BC-344 only.)		
	2	3H1621A/3	BRUSH; input (dynamotor), carbon, with ⅞" pigtail and spring soldered to end cap; 1/4" x 11/64", 1-5/8" overall length. (Not used in BC-344, BC-344-D.)	Low voltage	SC-D-2723
	2	3H1621A/4	BRUSH; output (dynamotor), carbon with ⅞" pigtail and spring soldered to end cap; ¼" x ½". (Not used in BC-344, BC-344-D.)	High voltage	SC-D-2723
	1	2Z1650/16.2	DIAL AND GEAR ASSEMBLY; split gear tuning dial.	For Tuning	SC-D-5431 RCA, MX-244065-502 Farn., 98-1574

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd) —

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
	1	2Z8550.1	SHUTTER ASSEMBLY; consists of shutter, spur gear and 4 brass rivets.	To blank out portion of tuning dial not being used	Farn., 98-1573 RCA, MX-243063-501
	1	2Z7560/2	PANE; dial, clear glass, 2-39/64" long, 1/16" thick, 2" wide at one end and ¾" wide at the other end.	Dial pane	SC-D-2535-13
	—	2Z5986	LAMP MOUNTING ASSEMBLY; consisting of:	For dial lamps	
	1	2Z5986/1	(A) MOUNTING; right hand, for lamp, miniature bayonet base.		SC-D-2573-1
	1	2Z5986/2	(B) MOUNTING; left hand. (Same as above, except for bracket, which is of opposite hand.)		SC-D-2573-2
	3	3Z3275	FUSE MOUNTING; 2-13/32" long, complete with bright zinc plated nut and neoprene washer.	Fuse holder	SC-D-2532-76
	1	2Z6702	MOUNTING FT-162; consisting of: 4 aluminum alloy bases, 4 aluminum alloy mounting supports, 4 steel studs and 4 felt pads; mounted on steel plate, ⅛" thick, 18" long, 6.906" wide.	Receiver mounting	SC-D-2577
	1	2C4314G/B2	BRACKET ASSEMBLY; (Except BC-344-(*).)	Dynamotor mounting	SC-D-2532

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd) —

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
	1	2Z5650-K	JACK COVER ASSEMBLY; consisting of: cover, 0.843" x 0.750" x 0.21875", brass cover support, spring and pad; word "KEY" engraved on cover.	Key jack	SC-D-2532-36
	1	2Z5650-M	JACK COVER ASSEMBLY; (Same as 2Z5650-K except for word "MICRO" engraved on cover.)	Microphone jack	SC-D-2532-37
	1	2Z5650-S2A	JACK COVER ASSEMBLY; (Same as 2Z5650-K except for words "SPEAKER 2ND AUDIO" engraved on cover.)	Speaker, 2d audio jack	SC-D-2532-38
	2	2Z5650-P2A	JACK COVER ASSEMBLY; (Same as 2Z5650-K except for words "PHONES 2ND AUDIO" engraved on cover.)	Phones, 2d audio jack	SC-D-2532-39
		2Z5650-P1A	JACK COVER ASSEMBLY; (Same as 2Z5650-K except for words "PHONES 1ST AUDIO" engraved on cover. (Used in BC-314, BC-314-C, D and BC-344 only.)	Phones, 1st audio jack	SC-D-2532-40
	1	2Z8794.1/C1	COVER; aluminum die casting, 2-5/8" high, 2-5/32" wide, 1-43/64" deep.	Cover for Socket SO-94	SC-D-2534-6
	1	3Z510	BINDING POST ASSEMBLY	Alternate signal antenna	SC-D-2532-71
	1	3Z763	BINDING POST ASSEMBLY	Ground	SC-D-2532-78
	1	2C4312/N1	NUT AND FERRULE ASSEMBLY	Cable connection for shielded binding post	SC-D-2532-13

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
	1	2Z5782.1	KNOB, SHAFT, AND PINION ASSEMBLY; consists of: compression nut, pinion, spring washer, knob, shaft, setscrew and standard #6 split-spring washer.	Fast tuning drive	SC-D-5431 RCA, KX-381510-501
		2Z5782.2	FAST TUNING KNOB AND DRIVE ASSEMBLY; Same as above except includes eccentric bushing in assembly.		Farn., 98-1469
	1	2Z5778	KNOB ASSEMBLY; with insert and setscrew, arrow engraved on face.	OFF-MVC-AVC	SC-D-2532-43
	1	2Z5779	KNOB ASSEMBLY; with insert and setscrew, "ALIGN INPUT" engraved on face.	Align input	SC-D-2532-44
	1	2Z5780	KNOB ASSEMBLY; with insert and setscrew, "CW-OSC ADJUST" engraved on face.	C-w oscillator adjustment	SC-D-2561-17
	1	2Z5773	KNOB ASSEMBLY; consists of: 1 each knob, dial, insert, 3 F. H. machine screws, and 1 #8-32 ⅜" setscrew.	Volume control	SC-D-2532-45
	1	2Z5783	KNOB; zinc alloy, die casting, knurled, with arrow engraved on face, O. D. 1-11/16", 1⅛" overall thickness, 0.1927" wide slot, hub dia. ¾".	Band change	SC-D-5431-56
	1	2Z5842-5	KNOB; Vernier, assembly. Consisting of: aluminum dial, clutch, knob and screw.	Vernier tuning	SC-D-5431-58
	1	3G1921-1	INSULATOR ASSEMBLY	For leads through r-f coil box assembly	SC-D-2553

Par. 40 *b*. Radio Receivers BC-314-(*) and BC-344-(*) (Cont'd).—

Order replacement parts by stock number, name and description, and receiver model.

Ref. No.	Quan. in Equip.	Signal Corps Stock Number	Name and Description of Part	Function	Signal Corps Drawing No.
	1	3G1921	TERMINAL ASSEMBLY (insulators)	For leads through mounting shelf	SC-D-2528
	5	2Z6931/21	LOCKSCREW AND NUT ASSEMBLY; panel, medium straight knurled head 11/16" long, 5/8" diameter, for 3/16" panel.	Secures panel to box	SC-D-2532
	1	2Z1650/42	SHAFT; switch, steel, 10½" long.	Removable band switch shaft	SC-D-5431-42
	1	2Z1650/17.2	SPRING; music wire.	For switch detent plunger	SC-D-5431-6
	1	2Z1650/7.3	SPRING; music wire.	For anti-backlash gears	SC-D-5431-14
	1	2Z1650/7.4	SPRING; music wire.	For tuning capacitor worm gear	SC-D-5431-46
	1	2Z1650/2	BALL; steel, 0.21875" dia.	For switch detent	SC-D-5431-94
	1	6L6632-9.10	SCREW; brass, tapered, slotted flat fillister head.	Secure dial and shutter shaft	SC-D-5431-4
	1	6L7949-4.89S	SCREW; steel, headless pilot point setscrew.	Secure band switch wafer shaft.	SC-D-5431-85
	9	2Z8762.2	SOCKET; octal, 8 "cinch" type contacts, phosphor bronze silver plated, complete with #4 nickel plated beryllium copper retaining ring.	Vacuum tubes sockets	SC-D-2538-63
	1	2C8795.11	SOCKET; 8 prong octal with mounting plate.	VT-97 Tube Socket	SC-D-1612-24
	1	6L50514-1	WASHER; fiber, gray vulcan, ½" OD.	Spacer	SC-D-2550-61

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driver slot in the end of the screw. The capacitor is of the air-padded type composed of a stator and a rotor. The rotor can be rotated through 360 degrees; at the completion of one revolution, the initial capacitance value is repeated. When the receiver is setting in a normal position, the stator plates are located below the center line (screw driver slot). Capacitance is at a minimum when the red dot is above the center line, and at a maximum when the red dot is below the center line.

(3) *Intermediate-frequency markings.*—

Each intermediate-frequency transformer is marked on top of the container with its functional purpose. For Receivers BC-314-(*) and BC-344-(*) the markings are: 1ST DET TRANS and C-292, 1ST IF TRANS and C-293, and 2D IF TRANS and C-294. An adjustment screw is located on the top of each transformer. Adjustment screws on the under side of the chassis are for 1ST DET TRANS and 2D IF TRANS. There is no under side adjustment for the 1ST IF TRANS. For Receivers BC-312-(*)[1], BC-312-(*)X[1] and BC-342-(*) the markings are: 1ST DET TRANS and C-282[1], 1ST IF TRANS and C-283, and 2D IF TRANS and C-284. Each of these transformers has a top and bottom adjustment screw. The 1ST DET TRANS[2] also contains the crystal phasing circuit equipped with a crystal. For all types of receivers, the adjustment screws on the intermediate-frequency transformers vary the position of the iron cores as a means of tuning. Each adjusting screw is locked by means of a lock nut.

f. Alignment frequencies.—

(1) Receivers BC-312-(*), BC-312(*)X, and BC-342-(*) use an intermediate frequency of 470 kc. The radio-frequency alignment frequencies for the different bands are:

Band	Alignment Frequency
A	2900 kc
B	4900 kc
C	7850 kc
D	11000 kc
E	13750 kc
F	17700 kc

[1]1st DET TRANS and C-412 in Receivers BC-312-N, and BC-312-NX.
1st DET TRANS and C-422 in Receivers BC-312-L and BC-312-M.
[2]Not on Receivers BC-312-L, BC-312-M, BC-312-N and BC-312-NX.

(2) On bands, A, B, and C the radio-frequency oscillator operates at a frequency 470 kc above the radio-frequency signal being received. For bands D, E, and F the radio-frequency oscillator operates 470 kc below the radio-frequency signal being received.

(3) On bands A, B, and C set the radio-frequency oscillator trimmer capacitors for the minimum capacitance for which the radio-frequency oscillator can be peaked. Set the radio-frequency oscillator trimmer of bands D, E, and F for the maximum capatance for which the radio-frequency oscillator can be peaked. This automatically avoids setting the radio-frequency oscillator at an image frequency.

(4) Receivers BC-314-(*) and BC-344-(*) use an intermediate-frequency of 92.5 kc. The radio-frequency alignment frequencies for the different bands are:

Band	Alignment Frequency
A	255 kc
B	440 kc
C	800 kc
D	1450 kc

(5) In Receivers BC-314-(*) and BC-344-(*), the radio-frequency oscillator operates at a frequency 92.5 kc above the radio-frequency signal being received.

(6) For Receivers BC-314-(*) and BC-344-(*), set the radio-frequency oscillator trimmer capacitors for the minimum capacitance that will peak the oscillator circuit.

(7) If a signal generator capable of generating a frequency of 92.5 kc for the alignment of the i-f of Receivers BC-314-(*) and BC-344-(*) type is not available, a substitute will have to be used. See *g* (4) (*b*) below.

g. Alignment Procedure.—

(1) *General.*—

This alignment procedure applies to Radio Receivers BC-312-(*), BC-312-(*)X, BC-314-(*), BC-342-(*) and BC-344-(*). The following panel control settings are made before the alignment is begun, and are left in these positions unless otherwise stated:

(*a*) Set OFF-MVC-AVC switch to MVC.

(*b*) Set CRYSTAL PHASING control to OUT (if receiver is equipped with crystal).

(*c*) Set CW-OSC OFF-ON switch to OFF (except for CW-OSC alignment.)

(*d*) Set VOL control for maximum output.

(*e*) Plug output meter into PHONES 2D AUDIO.

(2) *Calibration of Test Equipment.*—

Frequency Meter Set SCR-211-(*) can be used to check the frequency and stability of the signal generator used. This is done by coupling (inductively or capacitively - *not* directly) the output of the signal generator to the antenna of the frequency meter. Set the signal generator at the test frequency to be used, and adjust the output so that a satisfactory heterodyne note is heard in the phones which are plugged into the frequency meter. When this is accomplished adjust the frequency meter for zero beat with the signal generator. Check the frequency by reading the setting of the frequency meter, and make the necessary readjustments of the signal generator to keep it on frequency (using the frequency meter as the standard).

(3) *Order of Stage Alignment.*—

An over-all receiver alignment is accomplished by adjusting the various stages in the following order:

(*a*) Second intermediate-frequency transformer
(*b*) First intermediate-frequency transformer
(*c*) First detector output transformer
(*d*) Continuous-wave oscillator
(*e*) Crystal filter (when employed in the receiver)
(*f*) Radio-frequency oscillator
(*g*) Grid circuit of the first detector
(*h*) Grid circuit of the preceding radio-frequency stages
(*i*) Antenna alignment capacitors

(4) *Intermediate-frequency Alignment.*—

(*a*) With receiver controls set as instructed in paragraph 39*g* (1) and the signal generator set for the intermediate frequency of the receiver to be aligned, introduce the test signal into the mixer stage by connecting the signal generator output through a 300-

ohm resistor to the grid cap (which remains on the tube) of the mixer Tube VT-87. The ground side of the signal generator output must be connected to the ground connection of the receiver. *Always use the lowest signal generator output for which a good resonance indication can be obtained.* Align the intermediate-frequency transformer and working back toward and including the 1st detector output transformer. Repeat the adjustments by going through this sequence until the i-f circuits are perfectly aligned, as indicated by maximum output meter reading. In the event that some major repairs have been made in the i-f circuits, the latter may be so far out of alignment that this procedure cannot be used. If so move the signal generator connection to the grid cap of the second intermediate-frequency stage, without changing the ground connection. Adjust the intermediate-frequency transformers for maximum response, as indicated by the output meter. If this circuit will not peak at the frequency specified, a check must be made to determine the source of the trouble before the alignment procedure can be continued. Make a circuit continuity test to determine whether or not the i-f transformer concerned is defective. After the 2d i-f stage has been peaked, connect the signal generator output to the grid cap of the 1st i-f tube. Align this stage by proceeding as in the 2d i-f stage. Here again, if the circuit will not peak at the specified frequency, the source of trouble must be located before continuing. Move the signal generator connection to the grid cap of the 1st detector tube. Use the same procedure to align the 1st detector transformer. Go over all the stages again and adjust for maximum output. The i-f amplifier stages then will be aligned, and a 150-microvolt signal from the signal generator should produce an output signal of at least 10 milliwatts, with a noise component of not over 1 milliwatt.

(*b*) If a signal generator which tunes to 92.5 is not available use the following method of i-f alignment of BC-314-(*) and BC-344-(*):

(1) Set FREQUENCY dial of receiver to any frequency of any band, for example — 200 kilocycles.

(2) Plug headset into frequency meter, and insert the end of antenna lead from the frequency meter into the receiver oscillator compartment (open hinged cover) so that its end (no conductors exposed) lies close to the stator plates of the oscillator tuning capacitor section.

(3) Tune frequency meter to 92.5 kc *above* the frequency at which the receiver dial is set for (if 200 kc. 200 + 92.5 or 292.5 kc), then slowly tune the frequency meter dial back and forth, about 15 kc, until a varying beat frequency note is heard in the phones. When zero beat is heard in the phones, cease tuning, and note the point on the frequency meter dial at which zero beat is heard. Consult the frequency meter calibration book for the frequency. If the frequency obtained is not 92.5 kc more than the frequency indicated by the receiver dial, adjust the receiver oscillator trimmer in small steps until a zero beat is heard in the frequency meter headset *exactly* 92.5 kc above the receiver dial setting.

(4) When the oscillator trimmer is finallly adjusted to the desired frequency, tighten the locknut on this adjustment so that it cannot change. Disconnect and turn "off" frequency meter. Do not change receiver dial.

(5) Connect the I-72-(*), through a 250 $\mu\mu$f capacitor dummy antenna, to the receiver antenna post. Connect the output meter to the receiver's (final) output jack.

(6) Set the dial of the signal generator to the same frequency as that indicated on the receiver dial (200 kc). Use a modulated signal from the signal generator, and align the i-f transformers for peak output in the output meter as described in paragraph 39*g* (4) (*a*) above.

(5) *Adjustment of the Continuous-wave Oscillator.*—

With the i-f circuit properly aligned, the c-w oscillator can be adjusted. Set the CW-OSC OFF-ON switch to ON. Adjust the signal generator for a c-w signal (Modulator turned off). Set the arrow on the CW-OSC AJUST control to the horizontal position. The trimmer capacitor of the continuous-wave oscillator is accessible through a hole in the front panel (located above CW-OSC OFF-ON switch) after the slotted cap plug is removed. Vary this capacitor until a heterodyne note, zero beat, and finally a heterodyne note again are produced. Back up on the trimmer until zero beat is obtained. Rotate the CW-OSC ADJUST control 90 degrees to the right, then back to the horizonal position again, and then 90 degrees to the left. During this rotation the signal should increase in pitch, decrease as the horizontal position is approached, and then rise in pitch again as the control is rotated to the left. Check the adjustment for beats between the continuous

wave oscillator and the radio-frequency oscillator by varying the tuning of the receiver over a wide range of frequencies. The audio note should not change if the continuous-wave oscillator adjustment has been made properly.

(6) *Alignment of the Radio-frequency Oscillator.*—

Check the r-f oscillator alignment with the c-w oscillator turned off and modulation applied to the signal generator (with the signal generator output still connected to the grid of the first detector tube). Adjust the signal generator to the proper frequency for the band being aligned. With the receiver set on the corresponding band, the trimmer capacitor of the r-f oscillator must be adjusted until maximum response is obtained on the output meter. There are two possible adjustments of the trimmer that will produce identical output meter readings. One of these corresponds to the image frequency, while the other is the desired frequency. At this point it is impossible to tell whether the r-f oscillator is above or below the r-f frequency unless it is checked by means of the frequency meter. Such a check will also provide a means of double-checking the intermediate frequency, since this should be the difference between the signal generator reading and the reading of the frequency meter. When the above operations are completed for each of the bands using the specified alignment frequencies, the receiver is ready for alignment of the radio-frequency stages. *The adjustment of the radio-frequency oscillator trimmer capacitors is very critical and the slightest change in position of the trimmers detunes the radio-frequency oscillator circuits.* In the final adjustment, rock the main tuning dial of the receiver back and forth, and note the point of maximum output. If this test results in good centering of the frequency markings behind the hair-line indicator, the trimmer is properly adjusted. If, however, the maximum output is obtained at a different frequency marking than that of the signal generator, repeat the adjustment of the radio-frequency oscillator trimmer until exact frequency agreement is attained.

(7) *Alignment of the Radio-frequency Stages.*—

Remove the flat-head screws and shield plate that cover the r-f amplifier coil trimmers. The signal generator output must be connected to the grid cap of the 2d r-f tube through a 50 $\mu\mu$f capacitor for all receivers except the BC-314-(*) and BC-344-

(3) Tune frequency meter to 92.5 kc above the frequency at which the receiver dial is set for (if 200 kc. 200 + 92.5 or 292.5 kc), then slowly tune the frequency meter dial back and forth, about 15 kc, until a varying beat frequency note is heard in the phones. When zero beat is heard in the phones, cease tuning, and note the point on the frequency meter dial at which zero beat is heard. Consult the frequency meter calibration book for the frequency. If the frequency obtained is not 92.5 kc more than the frequency indicated by the receiver dial, adjust the receiver oscillator trimmer in small steps until a zero beat is heard in the frequency meter heater exactly 92.5 kc above the receiver dial setting.

(4) When the oscillator trimmer is finally adjusted to the desired frequency, tighten the locknut on the adjustment so that it cannot change. Disconnect and tag "off" frequency meter. Do not change receiver dial.

(5) Connect the I-72-(*), through a 250 μμf capacitor dummy antenna, to the receiver antenna post. Connect the output meter to the receiver's (final) output jack.

(6) Set the dial of the signal generator to the same frequency as that indicated on the receiver dial (200 kc). Use a modulated signal from the signal generator, and align the i-f transformers for peak output in the output meter as described in paragraph 79g (4) (a) above.

(7) Adjustment of the Continuous-wave Oscillator —

With the i-f circuit properly aligned, the c-w oscillator can be adjusted. Set the CW-OSC OFF-ON switch to ON. Adjust the signal generator for a c-w signal (Modulation turned off). Set the arrow on the CW-OSC ADJUST control to the horizontal position. The trimmer capacitor of the continuous-wave oscillator is accessible through a hole in the front panel (located above CW-OSC OFF-ON) switch after the identification plug is removed. Vary the capacitor until a heterodyne note, zero beat, and finally a heterodyne note again are produced. Back up on the trimmer until zero beat is obtained. Rotate the CW-OSC ADJUST control 90 degrees to the right, then back to the horizontal position again, and then 90 degrees to the left. During this rotation the signal should increase in pitch, decrease at the horizontal position to zero pitch, and then die in pitch again as the control is rotated to the left. Check the adjustment for beats between the continuous-

wave oscillator and the radio-frequency oscillator by varying the tuning of the receiver over a wide range of frequencies. The radio note should not change if the continuous-wave oscillator adjustment has been made properly.

(8) Alignment of the Radio-frequency Oscillator —

Check the i-f oscillator alignment with the c-w oscillator tuned off and modulation applied to the signal generator (with the signal generator output still connected to the grid of the first detector tube). Adjust the signal generator to the proper frequency for the band being aligned. With the receiver set on the corresponding band, the trimmer capacitor of the i-f oscillator must be adjusted until maximum response is obtained on the output meter. There are two possible adjustments of the trimmer that will produce identical output meter readings. One of these corresponds to the image frequency, while the other is the desired frequency. At this point it is impossible to tell whether the i-f oscillator is above or below the i-f frequency unless it is checked by means of the frequency meter. Such a check will also provide a means of double-checking the intermediate frequency, since this should be the difference between the signal generator reading and the reading of the frequency meter. When the above operations are completed for each of the bands using the specified alignment frequencies the receiver is ready for alignment of the radio-frequency stages. The adjustment of the radio-frequency oscillator trimmer capacitor is very critical and the slightest change in position of the trimmer affects the radio-frequency oscillator circuit. In the final adjustment, rock the main tuning dial of the receiver back and forth and note the point of maximum output. If this test results in good tracking of the frequency measuring behind the band-selector, the trimmer is properly adjusted. If, however, the maximum output is obtained at a different frequency matching that that of the signal generator, repeat the adjustment of the radio-frequency oscillator trimmer until exact frequency agreement is attained.

(9) Alignment of the Radio-frequency Stages —

Remove the flat-head screws and shield plate that cover the i-f amplifier and trimmers. The signal generator output must be connected to the grid cap of the 24 i-f tube through a 50 μμf capacitor for all receivers except the BC-314-(*) and BC-344-

(*): for these use a 250 $\mu\mu$f capacitor. The grid circuit of the 1st detector must be aligned for maximum output. Then connect the signal generator output to the grid cap of the first radio-frequency tube, and align the grid circuit of the 2d radio-frequency stage for maximum output. Leave the caps on the tubes whenever connecting the signal generator to them, and while working on the trimmers for a particular band do not touch the trimmer adjustments of other bands. Proceed with the alignment of one band and work towards the 1st r-f stage grid circuit. Recheck the overall r-f alignment before starting to align another band. Be sure to use low signal generator output.

(8) *Alignment of the Antenna Stage.*—

With the ALIGN INPUT control set in the mid position (arrow pointing up), adjust the trimmer across the grid of the first r-f stage for maximum output. This alignment must be checked over the entire range. Perfect alignment over the entire ranges of bands A and B is not possible in receivers of the BC-312-(*), BC-312-(*)X, and BC-342-(*) types. In these cases a compromise position of the antenna trimmer must be determined by checking alignment over the band several times, and then choosing the setting at which best results are obtained.

(9) *Crystal Filter Check.*—

When the i-f and r-f circuits are properly aligned, turn the CRYSTAL PHASING control from the OUT position and adjust for minimum background noise. Set the signal generator to an unmodulated signal. Turn the main dial sharply back and forth across the band point for which the receiver is tuned to receive the signal generator output. Under these conditions a musical chirp will be heard. If the chirp is present this indicates that the crystal is being excited by the varying i-f signal produced by the above tuning operation. The effect will be more pronounced for one direction of the main tuning dial than for the other. After a careful alignment, a retrim of the r-f oscillator with the signal generator output introduced into the receiver at the signal antenna, will yield the maximum crystal sensitivity. This adjustment will be very critical for each of the six bands and care must be taken that the previous alignment work is not lost. *Do not touch the radio-frequency or intermediate-frequency amplifier coil trimmers or the main tuning dial during retrimming operations on*

the radio-frequency oscillators. During the retrimming operations the phasing adjustment must not be disturbed. When retrimming operations are complete, set the CRYSTAL PHASING control to OUT, and check the signal sensitivity. There should be no loss in sensitivity.

(10) *Check of Final Alignment.*—

With the receiver aligned, the main tuning control should be varied throughout the band and the alignment checked for at least three different frequency settings in the band. Satisfactory performance will be obtained if the r-f oscillator is following the radio-frequency stages correctly and producing a difference (or beat) frequency equal to the intermediate frequency. In actual practice, absolutely perfect tracking is never obtained. It is essential that the receiver be checked throughout each band, and the circuits so compensated that optimum results are obtained. When a receiver is out of alignment, the radio-frequency oscillator often may be adjusted to the wrong side of the radio-frequency stages, in which case tracking with the receiver and preceding stages is not possible. *Consequently, extreme care must be taken to see that the initial radio-frequency oscillator alignment frequency is on the correct side of the radio-frequency stages so that proper tracking will be possible.* The final check of correct alignment is the sensitivity and selectivity of the receiver, after completion of all test. Receivers BC-312-(*), BC-312-(*)X, and BC-342-(*) will be capable of producing a 10-milliwatt output signal with a signal-to-noise ratio of 4 to 1, with not more than a 5-microvolt input at any frequency in the range of the receiver. Receivers BC-314-(*) and BC-344-(*) will be able to produce a 10-milliwatt signal output with a signal-to-noise ratio of 4 to 1, with not more than a 10-microvolt input at any frequency within the range of the receiver.

h. Special Alignment Procedure for the Crystal Filter.—

Under the alignment conditions described in *g* above, the receiver sensitivity without the use of the crystal is at its maximum. Considerably less sensitivity than that indicated in paragraph 39*g* (10) is obtained when the CRYSTAL PHASING control is set for maximum crystal selectivity. In the event that maximum sensitivity in conjunction with crystal selectivity is required, use the following alignment procedure:

(1) Align the receiver as described in paragraph 39 *g*.

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(*); for then use a 240 ohm capacitor. The grid circuit of the detector must be aligned for maximum output. Then connect the signal generator output to the grid cap of the first radio-frequency tube, and align the grid circuit of the 2d radio-frequency stage for maximum output. Leave the cap on the tubes whenever connecting the signal generator to them, and while working on the trimmers for a particular band do not touch the trimmer adjustments of other bands. Proceed with the alignment of one band and work towards the 1st r-f stage grid circuit. Recheck the overall r-f alignment before starting to align another band. Be sure to use low signal generator output.

(8) Alignment of the Antenna Stage—

With the ALIGN INPUT control set in the mid position (arrow pointing up), adjust the trimmer across the grid of the first r-f stage for maximum output. This alignment must be checked over the entire range. Perfect alignment over the entire range of bands A and B is not possible in receivers of the BC-312-(*), BC-312-(*)X, and BC-342-(*) types. In these cases a compromise position of the antenna trimmer must be determined by checking alignment over the band several times, and then choosing a the setting at which best results are obtained.

(9) Crystal Filter Check—

When the i-f and r-f circuits are properly aligned, turn the CRYSTAL PHASING control from the OUT position and adjust for minimum background noise. Set the signal generator to an unmodulated signal. Turn the main dial slowly back and forth across the band point for which the receiver is tuned to receive the signal generator output. Under these conditions a musical chirp will be heard. If the chirp is present this indicates that the crystal is being excited by the varying i-f signal produced by the above tuning operation. The effect will be most pronounced for one direction of the main tuning dial than for the other. After a careful alignment a return of the r-f oscillator with the signal generator output introduced into the receiver at the signal antenna, will yield the maximum crystal sensitivity. This adjustment will be very critical for each of the six bands and care must be taken that the previous alignment work is not lost. Do not attempt the radio-frequency or intermediate-frequency amplifier adjustments in the manner tuning dial during intermediate operations on

RADIO RECEIVERS BC-312-(*), BC-312-(*)X, BC-342-(*), AND BC-344-(*)

the radio-frequency oscillator. During the remaining operations the phasing adjustment must not be disturbed. When phasing operations are complete, set the CRYSTAL PHASING control to OUT, and check the signal sensitivity. There should be no loss in sensitivity.

(10) Check of Final Adjustment—

With the receiver aligned, the main tuning control should be varied throughout the band and the alignment checked for at least three different frequency settings in the band. Satisfactory performance will be obtained if the r-f oscillator is following the radio-frequency stages correctly and producing a difference (or beat) frequency equal to the intermediate frequency. In actual practice, absolute perfect tracking is never obtained. It is essential that the receiver be checked throughout each band, and the circuits so compensated that optimum results are obtained. When a receiver is out of alignment, the radio-frequency oscillator often may be adjusted in the wrong side of the radio-frequency stages, in which case tracking with the receiver and preceding stages is not possible. Consequently, extreme care must be taken to see that the initial radio-frequency oscillator adjustment (frequency is on the correct side of the radio-frequency stages so that proper tracking will be possible. The final check of correct alignment is the sensitivity and selectivity of the receiver, after completion of all tests. Receivers BC-312-(*), BC-312-(*)X, and BC-342-(*) will be capable of producing a 10-milliwatt output signal with a signal-to-noise ratio of 4 to 1, with not more than a 5-microvolt input at any frequency in the range of the receiver. Receivers BC-344-(*) and BC-344-(*) will be able to produce a 10-milliwatt signal output with a signal-to-noise ratio of 4 to 1, with not more than a 10-microvolt input at any frequency within the range of the receiver.

b. Special Alignment Procedure for the Crystal Filter—

Under the alignment conditions described in g above, the receiver sensitivity without the use of the crystal is at its maximum. Consequently less sensitivity than that indicated in paragraph 39g (10) is obtained when the CRYSTAL PHASING control is set for maximum crystal selectivity. In the event that maximum sensitivity is to be combined with crystal selectivity is required, use the following alignment procedure:

(1) Align the receiver as described in paragraph 39 g.